

Radial Lead Type

Series : **FS** Type : **A**



Features

- Low ESR, Miniaturized (1 size smaller than series FR)
- Endurance : 105 °C 5000 h to 10000 h
- RoHS compliant

Country of origin

- Malaysia

Specifications

Category temperature range	-40 °C to +105 °C										
Rated voltage range	6.3 V.DC to 100 V.DC										
Capacitance range	27 µF to 10000 µF										
Capacitance tolerance	±20 % (120 Hz/+20 °C)										
Leakage current	I < 0.01 CV (µA) After 2 minutes										
Dissipation factor (tan d)	V.DC	6.3	10	16	25	35	50	63	80	100	(max.) (120 Hz/+20 °C)
	tan d	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08	
	Add 0.02 per 1000 µF for products of 1000 µF or more.										
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. Duration 05×11/ 06.3×11.2 : 5000 hours, 08×11.5/ 010×12.5 : 6000 hours 08×15/ 010×16 : 8000 hours, 08×20 : 9000 hours 010×20 to 010×25/ 012.5×20 to 012.5×35/ 016×20 to 016×25 : 10000 hours										
	Capacitance change	Within ±25 % of the initial value (6.3 V.DC to 10 V.DC : ±30 %)									
	tan d	< 200 % of the initial limit									
	DC leakage current	Within the initial limit									
	Shelf life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)									

Frequency correction factor for ripple current

Rated voltage (V.DC)	Capacitance (µF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k to
6.3 to 100	27 to 33	0.45	0.55	0.75	0.90	1.00
	47 to 330	0.60	0.70	0.85	0.95	1.00
	390 to 1000	0.65	0.75	0.90	0.98	1.00
	1200 to 10000	0.75	0.80	0.95	1.00	1.00

Dimensions

OD	5	6.3	8	10	12.5	16	(Unit : mm)
L	—	—	—	—	12.5 to 25	30 to 35	—
Od	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	5.0	7.5

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

Case size/ Impedance/ Ripple current

Rated voltage (V.DC)	6.3 V.DC to 35 V.DC			50 V.DC		
	Impedance (Ω /100 kHz)		Ripple current (mA r.m.s./100 kHz)	Impedance (Ω /100 kHz)		Ripple current (mA r.m.s./100 kHz)
	+20 °C	−10 °C	+105 °C	+20 °C	−10 °C	+105 °C
Case size (mm) (OD×L)						
5 × 11	0.300	1.000	280	0.340	1.130	250
6.3 × 11.2	0.130	0.430	455	–	–	–
8 × 11.5	0.056	0.168	950	–	–	–
8 × 15	0.041	0.123	1240	0.045	0.135	1140
8 × 20	0.030	0.090	1560	0.033	0.099	1430
10 × 12.5	0.043	0.114	1290	–	–	–
10 × 16	0.028	0.078	1790	–	–	–
10 × 20	0.020	0.057	2180	0.023	0.069	1890
10 × 25	0.018	0.054	2470	0.022	0.066	2150
12.5 × 20	0.018	0.045	2600	–	–	–
12.5 × 25	0.015	0.038	3190	0.018	0.045	2660
12.5 × 30	0.013	0.033	3630	0.016	0.040	3160
12.5 × 35	0.012	0.030	3750	0.014	0.035	3270
16 × 20	0.017	0.043	3300	–	–	–
16 × 25	0.014	0.035	3820	0.016	0.040	3320

Rated voltage (V.DC)	63 V.DC			80 V.DC to 100 V.DC		
	Impedance (Ω /100 kHz)		Ripple current (mA r.m.s./100 kHz)	Impedance (Ω /100 kHz)		Ripple current (mA r.m.s./100 kHz)
	+20 °C	−10 °C	+105 °C	+20 °C	−10 °C	+105 °C
Case size (mm) (OD×L)						
5 × 11	0.510	2.040	175	–	–	–
6.3 × 11.2	–	–	–	–	–	–
8 × 11.5	–	–	–	0.160	0.720	490
8 × 15	0.068	0.272	741	0.112	0.504	590
8 × 20	0.050	0.200	930	0.096	0.432	810
10 × 12.5	0.063	0.252	761	0.112	0.448	600
10 × 16	0.045	0.180	1073	0.072	0.288	930
10 × 20	–	–	–	0.054	0.224	1120
10 × 25	0.033	0.132	1500	0.044	0.176	1200
12.5 × 20	0.033	0.125	1582	0.043	0.135	1400
12.5 × 25	0.027	0.092	1995	0.034	0.108	1800
12.5 × 30	–	–	–	0.030	0.099	2200
12.5 × 35	0.021	0.071	2780	0.023	0.070	2380
16 × 20	0.029	0.093	2153	0.032	0.108	1450
16 × 25	0.024	0.074	2988	0.025	0.076	2500

Characteristics list

Rated voltage (V.DC)	Cap. (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty	
		OD	L	Ripple current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead dia. Od	Lead space				Straight leads (pcs)	Taping (pcs)
								Straight	Taping * B	Taping * H			
6.3	220	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFS0J221()	200	2000
	1500	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFS0J152L()	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFS0J152()	200	500
	1800	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFS0J182L()	200	1000
	2000	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFS0J202L()	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFS0J202()	200	500
	2200	10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFS0J222()	200	500
	2700	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFS0J272()	200	500
	3300	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFS0J332()	200	500
	3900	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFS0J392L()	200	500
	4700	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFS0J472()	200	500
	5100	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFS0J512()	200	500
	5600	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFS0J562()	200	500
	6200	12.5	30	3630	0.013	10000	0.8	5.0			EEUFS0J622L	100	
	6800	12.5	30	3630	0.013	10000	0.8	5.0			EEUFS0J682L	100	
	7500	12.5	35	3750	0.012	10000	0.8	5.0			EEUFS0J752L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFS0J752S()	100	250
	8200	12.5	35	3750	0.012	10000	0.8	5.0			EEUFS0J822L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFS0J822S()	100	250
	9100	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFS0J912()	100	250
	10000	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFS0J103()	100	250
10	180	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFS1A181()	200	2000
	330	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFS1A331()	200	2000
	820	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFS1A821()	200	1000
	1000	10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFS1A102()	200	500
	1200	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFS1A122L()	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFS1A122()	200	500
	1800	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFS1A182L()	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFS1A182()	200	500
	2000	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFS1A202()	200	500
	2200	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFS1A222()	200	500
	2700	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFS1A272L()	200	500
	3600	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFS1A362()	200	500
	4700	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFS1A472()	200	500
	5100	12.5	30	3630	0.013	10000	0.8	5.0			EEUFS1A512L	100	
	5600	12.5	30	3630	0.013	10000	0.8	5.0			EEUFS1A562L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFS1A562S()	100	250
	7500	12.5	35	3750	0.012	10000	0.8	5.0			EEUFS1A752L	100	
	8200	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFS1A822()	100	250

· When requesting taped product, please put the letter "B" or "H" between the "()". Lead wire pitch *B=5 mm, 7.5 mm, H=2.5 mm.

· Please refer to the page of "Taping dimensions".

Characteristics list

Rated voltage (V.DC)	Cap. (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty	
		OD	L	Ripple current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead dia. Od	Lead space				Straight leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *H			
16	120	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFS1C121()	200	2000
	510	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFS1C511()	200	1000
	820	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFS1C821L()	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFS1C821()	200	500
	1200	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFS1C122L()	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFS1C122()	200	500
	1800	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFS1C182()	200	500
	2200	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFS1C222L()	200	500
	2400	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFS1C242()	200	500
	3300	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFS1C332()	200	500
	3600	12.5	30	3630	0.013	10000	0.8	5.0			EEUFS1C362L	100	
	3900	12.5	30	3630	0.013	10000	0.8	5.0			EEUFS1C392L	100	
	4700	16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFS1C472S()	100	250
	5100	12.5	35	3750	0.012	10000	0.8	5.0			EEUFS1C512L	100	
25	6200	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFS1C622()	100	250
	1200	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFS1E122()	200	500
	2200	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFS1E222()	200	500
	3300	12.5	35	3750	0.012	10000	0.8	5.0			EEUFS1E332L	100	
	3900	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFS1E392()	100	250
35	330	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFS1V331L()	200	1000
	820	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFS1V821()	200	500
	1000	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFS1V102L()	200	500
	1500	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFS1V152()	200	500
	1800	16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFS1V182S()	100	250
	2700	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFS1V272()	100	250
50	27	5	11	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFS1H270()	200	2000
	150	8	15	1140	0.045	8000	0.6	3.5	5.0		EEUFS1H151L()	200	1000
	220	8	20	1430	0.033	9000	0.6	3.5	5.0		EEUFS1H221L()	200	1000
	330	10	20	1890	0.023	10000	0.6	5.0	5.0		EEUFS1H331()	200	500
	390	10	25	2150	0.022	10000	0.6	5.0	5.0		EEUFS1H391L()	200	500
	680	12.5	25	3660	0.018	10000	0.6	5.0	5.0		EEUFS1H681()	200	500
	820	12.5	30	3160	0.016	10000	0.8	5.0			EEUFS1H821L	100	
	1000	12.5	35	3270	0.014	10000	0.8	5.0			EEUFS1H102L	100	
	1200	16	25	3320	0.016	10000	0.8	7.5	7.5		EEUFS1H122()	100	250
63	27	5	11	175	0.510	5000	0.5	2.0	5.0	2.5	EEUFS1J270()	200	2000
	120	8	15	741	0.068	8000	0.6	3.5	5.0		EEUFS1J121L()	200	1000
		10	12.5	761	0.063	6000	0.6	5.0	5.0		EEUFS1J121()	200	500
	180	8	20	930	0.050	9000	0.6	3.5	5.0		EEUFS1J181L()	200	1000
		10	16	1073	0.045	8000	0.6	5.0	5.0		EEUFS1J181()	200	500
	330	10	25	1500	0.033	10000	0.6	5.0	5.0		EEUFS1J331L()	200	500
	390	12.5	20	1582	0.033	10000	0.6	5.0	5.0		EEUFS1J391()	200	500
	560	12.5	25	1995	0.027	10000	0.6	5.0	5.0		EEUFS1J561()	200	500
	680	16	20	2153	0.029	10000	0.8	7.5	7.5		EEUFS1J681S()	100	250
	820	12.5	35	2780	0.021	10000	0.8	5.0			EEUFS1J821L	100	
1000	16	25	2988	0.024	10000	0.8	7.5	7.5		EEUFS1J102()	100	250	

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· Please refer to the page of "Taping dimensions".

Characteristics list

Rated voltage (V.DC)	Cap. (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty	
		OD	L	Ripple current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead dia. Od	Lead space				Straight leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *H			
80	47	8	11.5	490	0.160	6000	0.6	3.5	5.0		EEUFS1K470()	200	1000
	56	8	11.5	490	0.160	6000	0.6	3.5	5.0		EEUFS1K560()	200	1000
	68	8	15	590	0.112	8000	0.6	3.5	5.0		EEUFS1K680()	200	1000
	82	8	15	590	0.112	8000	0.6	3.5	5.0		EEUFS1K820()	200	1000
	100	8	20	810	0.096	9000	0.6	3.5	5.0		EEUFS1K101L()	200	1000
		10	12.5	600	0.112	6000	0.6	5.0	5.0		EEUFS1K101()	200	500
	120	8	20	810	0.096	9000	0.6	3.5	5.0		EEUFS1K121L()	200	1000
	150	10	16	930	0.072	8000	0.6	5.0	5.0		EEUFS1K151()	200	500
	180	10	20	1120	0.054	10000	0.6	5.0	5.0		EEUFS1K181()	200	500
	220	10	20	1120	0.054	10000	0.6	5.0	5.0		EEUFS1K221()	200	500
		10	25	1200	0.044	10000	0.6	5.0	5.0		EEUFS1K221L()	200	500
	270	10	25	1200	0.044	10000	0.6	5.0	5.0		EEUFS1K271L()	200	500
		12.5	20	1400	0.043	10000	0.6	5.0	5.0		EEUFS1K271()	200	500
	390	12.5	25	1800	0.034	10000	0.6	5.0	5.0		EEUFS1K391()	200	500
	470	12.5	30	2200	0.030	10000	0.8	5.0			EEUFS1K471L()	100	
		16	20	1450	0.032	10000	0.8	7.5	7.5		EEUFS1K471S()	100	250
560	12.5	35	2380	0.023	10000	0.8	5.0			EEUFS1K561L()	100		
680	16	25	2500	0.025	10000	0.8	7.5	7.5		EEUFS1K681()	100	250	
100	27	8	11.5	490	0.160	6000	0.6	3.5	5.0		EEUFS2A270()	200	1000
	33	8	11.5	490	0.160	6000	0.6	3.5	5.0		EEUFS2A330()	200	1000
	39	8	15	590	0.112	8000	0.6	3.5	5.0		EEUFS2A390()	200	1000
	47	8	15	590	0.112	8000	0.6	3.5	5.0		EEUFS2A470L()	200	1000
		10	12.5	600	0.112	6000	0.6	5.0	5.0		EEUFS2A470()	200	500
	56	8	20	810	0.096	9000	0.6	3.5	5.0		EEUFS2A560L()	200	1000
	68	8	20	810	0.096	9000	0.6	3.5	5.0		EEUFS2A680L()	200	1000
		10	16	930	0.072	8000	0.6	5.0	5.0		EEUFS2A680()	200	500
	120	10	20	1120	0.054	10000	0.6	5.0	5.0		EEUFS2A121()	200	500
		10	25	1200	0.044	10000	0.6	5.0	5.0		EEUFS2A121L()	200	500
	150	10	25	1200	0.044	10000	0.6	5.0	5.0		EEUFS2A151L()	200	500
		12.5	20	1400	0.043	10000	0.6	5.0	5.0		EEUFS2A151()	200	500
	180	12.5	25	1800	0.034	10000	0.6	5.0	5.0		EEUFS2A181()	200	500
	220	12.5	25	1800	0.034	10000	0.6	5.0	5.0		EEUFS2A221()	200	500
	270	12.5	30	2200	0.030	10000	0.8	5.0			EEUFS2A271L()	100	
		16	20	1450	0.032	10000	0.8	7.5	7.5		EEUFS2A271S()	100	250
330	12.5	35	2380	0.023	10000	0.8	5.0			EEUFS2A331L()	100		
390	16	25	2500	0.025	10000	0.8	7.5	7.5		EEUFS2A391()	100	250	

***XiGHOiQHV DQG SUHFDXWiRQV UHJDUGiQJ WKH
WHFKQiFDO iQIRUPDWiRQ DQG XVH RI RXU SURGXFWV
GHVFUiEHG iQ WKiV RQOiQH FDWDORJ.**

- II \RX ZDQW WR XVH RXU SURGXFWV GHVFUiEHG iQ WKiV RQOiQH FDWDORJ IRU DSSOiFDWiRQV UHTXiUiQJ VSHFiDO TXDOiWiHV RU UHOiDEiOiW\, RU IRU DSSOiFDWiRQV ZKHUH WKH IDiOXUH RU PDOIXQFWiRQ RI WKH SURGXFWV PD\ GiUHFwO\ jHRSDUGi]H KXPdQ OiIH RU SRWHQWiDOO\ FDXVH SHUVRQDO iQjXU\ (H. J. DiUFUDIW DQG DHURVSDFH HTXiSPHQW, WUDIIiF DQG WUDQVSRUWDWiRQ HTXiSPHQW, FRPEXVWiRQ HTXiSPHQW, PHGiFDO HTXiSPHQW, DFFiGHQW SUHYHQWiRQ, DQWi-FUiPH HTXiSPHQW, DQG/RU VDIHW\ HTXiSPHQW3, iW iV QHFHVVDU\ WR YHuiI\ ZKHWKHU WKH VSHFiLiFDWiRQV RI RXU SURGXFWV IiW WR VXFK DSSOiFDWiRQV. 30HDVH HQVXUH WKDW \RX ZiOO DVN DQG FKHFN ZiWK RXU iQTXiu\ GHVN DV WR ZKHWKHU WKH VSHFiLiFDWiRQV RI RXU SURGXFWV IiW WR VXFK DSSOiFDWiRQV XVH EHIRUH \RX XVH RXU SURGXFWV.
- 7KH TXDOiW\ DQG SHUIRUPDQFH RI RXU SURGXFWV DV GHVFUiEHG iQ WKiV RQOiQH FDWDORJ RQO\ DSSO\ WR RXU SURGXFWV ZKHQ XVHG iQ iVRODWiRQ. 7KHUHIRUH, SOHDVH HQVXUH \RX HYDOXDWH DQG YHuiI\ RXU SURGXFWV XQGHU WKH VSHFiLiF FiUFXPVWDQFHV iQ ZKiFK RXU SURGXFWV DUH DVVHPEOHG iQ \RXU RZQ SURGXFWV DQG iQ ZKiFK RXU SURGXFWV ZiOO DFwXD00\ EH XVHG.
- II \RX XVH RXU SURGXFWV iQ HTXiSPHQW WKDW UHTXiUHV D KiJK GHJUHH RI UHOiDEiOiW\, UHJDUGOHVV RI WKH DSSOiFDWiRQ, iW iV UHFRPPHQGHG WKDW \RX VHW XS SURWHFWiRQ FiUFXiWV DQG UHGXQGDQF\ FiUFXiWV iQ RUGHU WR HQVXUH VDIHW\ RI \RXU HTXiSPHQW.
- 7KH SURGXFWV DQG SURGXFW VSHFiLiFDWiRQV GHVFUiEHG iQ WKiV RQOiQH FDWDORJ DUH VXEjHFw WR FKDQJH IRU iPSURYHPPHQW ZiWKRXW SuiRU QRWiFH. 7KHUHIRUH, SOHDVH EH VXUH WR UHTXHVW DQG FRQiUP WKH 0DWHVW SURGXFW VSHFiLiFDWiRQV ZKiFK H[SODiQ WKH VSHFiLiFDWiRQV RI RXU SURGXFWV iQ GHWDiO, EHIRUH \RX IiQDOi]H WKH GHViJQ RI \RXU DSSOiFDWiRQV, SXUFKDVH, RU XVH RXU SURGXFWV.
- 7KH WHFKQiFDO iQIRUPDWiRQ iQ WKiV RQOiQH FDWDORJ SURYiGHV H[DPSoHV RI RXU SURGXFWV' W\SiFDO RSHUDWiRQV DQG DSSOiFDWiRQ FiUFXiWV. : H GR QRW JXDUDQWHH WKH QRQ-iQiUiQJHPHQW RI WKiUG SDUW\ 'V iQWHOOFwXD0 SURSHUW\ UiJKWV DQG ZH GR QRW JUDQW DQ\ OiFHQVH, UiJKW, RU iQWHUHVW iQ RXU iQWHOOFwXD0 SURSHUW\.
- II DQ\ RI RXU SURGXFWV, SURGXFW VSHFiLiFDWiRQV DQG/RU WHFKQiFDO iQIRUPDWiRQ iQ WKiV RQOiQH FDWDORJ iV WR EH H[SRUWHG RU SURYiGHG WR QRQ-UHVighQWV, WKH ODZV DQG UHJXODWiRQV RI WKH H[SRUiQJ FRXQWU\, HVSHFiDOO\ ZiWK UHJDUG WR VHFxiW\ DQG H[SRUW FRQWURO, VKDOO EH REVHUYHG.

**<5HJDUGiQJ WKH &HUWiLiFDWH RI &RPSOiDQFH ZiWK
WKH (8 5R+6 DiUHFWiYH/5(\$&+ 5HJXODWiRQV !**

- 7KH VZiWFKRYHU GDWH IRU FRPSOiDQFH ZiWK WKH 5R+6 DiUHFWiYH/5(\$&+ 5HJXODWiRQV YDuiHV GHSHQGiQJ RQ WKH SDUW QXPEHU RU VHuiHV RI RXU SURGXFWV.
- :KHQ \RX XVH WKH iQYHQWURU\ RI RXU SURGXFWV IRU ZKiFK iW iV XQFOHDU ZKHWKHU WKRvH SURGXFWV DUH FRPSOiDQW ZiWK WKH 5R+6 DiUHFWiYH/5(\$&+ 5HJXODWiRQ, SOHDVH VHOHFW "6DOHV iQTXiu\" iQ WKH ZHEViWH iQTXiu\ IRUP DQG FRQWDFW XV.

= H GR QRW WDNH DQ\ UHVSROViEiOiW\ IRU WKH XVH RI RXU SURGXFWV RXWViGH WKH VFRSH RI WKH VSHFiLiFDWiRQV, GHVFUiSWiRQV, JXiGHOiQHV DQG SUHFDXWiRQV GHVFUiEHG iQ WKiV RQOiQH FDWDORJ.

1RWiFHV

□ \$\$\$oIFDEOH 0DZV DQG UHJXODWiRQV

- 嵇7KiV SURGXFW FRPSOihV ZiWk WKH 5R+6 DiUHFwiYH (5HVWUiFwiRQ RI WKH XVH RI FHUWdiQ KD)]DUGRXV VXEVDQDFHV iQ HOHFWUiFDO DQG HOHFWURQiF HTXiSPHQW (DI5(&7I9(2011/65/(8 DQG3(832015/86333.
- 1R 2]RQH DHSOHwiQJ &KHPiFDOV(2D&'V3, FRQWUROOHG XQGHU WKH ORQUHDO 3URWRERO \$JUHHPHQW, DUH XVHG iQ SURGXFiQJ WKiV SURGXFW.
 - :H GR QRW XVH 3%%V RU 3%D(V DV EURPiQDWHG IDPH UHWDUGDQWV.
 - ([SRUW SURFHGXUH ZKiFK IROORZHG H[SRUW UHODWHG UHJXODWiRQV, VXFK DV IRUHiJQ H[FKDQJH DQG D IRUHiJQ WUDGH PHWKRG, RQ WKH RFFDVirQ RI H[SRUW RI WKiV SURGXFW.
 - 7KHVH SURGXFWV DUH QRW GDQJHURXV JRRGV RQ WKH WUDQVSRUWDWiRQ DV iGHQWiIiHG E\ 81(8QiWHG 1DWiRQV3 QXPEHUV RU 81 FODVViIiFDWiRQ.

□ /iPiWHG DSSoIFDWiRQV

- 7KiV FDSDFiWRU iV GHViJQH G WR EH XVHG IRU HOHFWURQiFV FiUFxiWV VXFK DV DXGiR/YiVXDO HTXiSPHQW, KRPH DSSoIDQFHV, FRPSXWHUV DQG RWKHU RiIiF HTXiSPHQW, RSWiFDO HTXiSPHQW, PHDVXUiQJ HTXiSPHQW.
- 嵇 +iJK UHOiDeioiW\ DQG VDIHW\ DUH UHTXiUH > EH / D SRVViEioiW\ WKDW iQFRUHFw RSHUDWiRQ RI WKiV SURGXFW PD\ GR KDUP WR D KXPdQ 0iH RU SURSHUW\ @ PRUH. :KHQ XVH iV FRQViGHUHG E\ WKH XVH, WKH GHoiYHU\ VSHFiIFDWiRQV ZKiFK VXiWHG WKH XVH VHSUDUDWHO\ QHHG WR EH H[FKDQJHG.

□ IQWOOHFWXDO SURSHUW\ UiJKWV DQG OiFHQVHV

- 7KH WHFKQiFDO iQIRUPDWiRQ iQ WKiV VSHFiIFDWiRQ SURYiGHV H[DPSOHV RI RXU SURGXFWV' W\SiFDO RSHUDWiRQV DQG DSSoIFDWiRQ FiUFxiWV. :H GR QRW JXDUDQWHH WKH QRQ-iQiUiQJHPHQW RI WKiUG SDUW\ 'V iQWOOHFWXDO SURSHUW\ UiJKWV DQG ZH GR QRW JUDQW DQ\ OiFHQVH, UiJKW, RU iQWUHVWV iQ RXU iQWOOHFWXDO SURSHUW\.

IWHPV WR EH REVHUYHG

□)RU VSHFiIFDWiRQ

- 7KiV VSHFiIFDWiRQ JXDUDQWHV WKH TXDoiW\ DQG SHUIRUPDQFH RI WKH SURGXFW DV iQGiYiGXDO FRPSRQHQWV.
- 7KH GXUDEioiW\ GiIiHUV GHSHQGQiQJ RQ WKH HQYiURQPHQW DQG WKH FRQGiWiRQV RI XVDJH.
- %HIRUH XVH, FKHFN DQG HYDOXDWH WKHiU FRPSDWiEioiW\ ZiWk DFWXDO FRQGiWiRQV ZKHQ iQVWDOOHG iQ WKH SURGXFWV.
- :KHQ VDIHW\ UHTXiUHPHQWV FDQQRW EH VDWiViIiHG iQ \RXU WHFKQiFDO H[DPiQDWiRQ, iQIRUP XV iPPHGidWHO\.
- 嵇 DR QRW XVH WKH SURGXFWV EH\RQG WKH VSHFiIFDWiRQV GHVFUiEHG iQ WKiV GRFXPHQW.

□ 8SRQ DSSoIFDWiRQ WR SURGXFWV ZKHUH VDIHW\ iV UHJDUGHG DV iPSRUWDQW

- iQVWDOO WKH IROORZiQJ V\VWHPV IRU D IDioVDiH GHViJQ WR HQVXUH VDIHW\ iI WKHVH SURGXFWV DUH WR EH XVHG iQ HTXiSPHQW ZKHUH D GHIHFW iQ WKHVH SURGXFWV PD\ FDXVH WKH ORVV RI KXPdQ 0iH RU RWKHU ViJQiIiFDWiRQ GDPDJH, VXFK DV GDPDJH WR YHKiFOHV (DXWRPREiOH, WUDiQ, YHVW03, WUDiIiF 0iJKWV, PHGiFDO HTXiSPHQW, DHURVSDFH HTXiSPHQW, HOHFWUiF KHDWiQJ DSSoIDQFHV, FRPEXVWiRQ/ JDV HTXiSPHQW, URWDWiQJ URWDWiQJ HTXiSPHQW, DQG GiVDVWU/FUiPH SUHYHQWiRQ HTXiSPHQW.
- (13 7KH V\VWHP iV HTXiSSHG ZiWk D SURWHFWiRQ FiUFxiW DQG SURWHFWiRQ GHYiFH.
- (23 7KH V\VWHP iV HTXiSSHG ZiWk D UHGXQGDQW FiUFxiW RU RWKHU V\VWHP WR SUHYHQW DQ XQVDiH VWDWXV iQ WKH HYHQW RI D ViQJOH iDXOW.

□ &RQGiWiRQV RI XVH

- %HIRUH XViQJ WKH SURGXFWV, FDUHiX00\ FKHFN WKH HiIHFwV RQ WKHiU TXDoiW\ DQG SHUIRUPDQFH, DQG GHWHUPiQH G ZKHWKHU RU QRW WKH\ FDQ EH XVHG. 7KHVH SURGXFWV DUH GHViJQH G DQG PDQXiDFWXUH G IRU JHQHUDO-SXUSRVH DQG VWDQGDUG XVH iQ JHQHUDO HOHFWURQiF HTXiSPHQW. 7KHVH SURGXFWV DUH QRW iQWHQGHG IRU XVH iQ WKH IROORZiQJ VSHFiDO FRQGiWiRQV.
 - (13 IQ 0iTXiG, VXFK DV :DWHU, 2i0, &KHPiFDOV, RU 2UJDQiF VROYHQW.
 - (23 IQ GiUHFw VXQ0iJKW, RXWGRUV, RU iQ GXVW.
 - (33 IQ YDSRU, VXFK DV GHZ FRQGHQVDWiRQ ZDWHU RI UHViVWiYH HOHPHQW, RU ZDWHU OHNDNJH, VDOW\ DiU, RU DiU ZiWk D KiJK FRQFHQWUDWiRQ FRUURViYH JDV, VXFK DV 02, +26, 1+3, 622, RU 12[.
 - (43 IQ DQ HQYiURQPHQW ZKHUH VWURQJ VWDWiF HOHFWUiFiW\ RU HOHFWURPDJHQWiF ZDYHV H[iVW.
 - (53 ORXQWiQJ RU SODFiQJ KHDW-JHQHUDWiQJ FRPSRQHQWV RU iQIODPPDEOHV, VXFK DV YiQ\O-FRDWHG ZiUHV, QHDU WKHVH SURGXFWV.
 - (63 6HDoiQJ RU FRDWiQJ RI WKHVH SURGXFWV RU D SuiQWHG FiUFxiW ERDUG RQ ZKiFK WKHVH SURGXFWV DUH PRXQWHG, ZiWk UHViQ DQG RWKHU PDWHUiDO.
 - (73 8ViQJ UHVROYHQW, ZDWHU RU ZDWHU-VROXEOH FOHDQHU IRU IOX[FOHDQiQJ DJHQW DiWHU VROGHUiQJ. (iQ SDUWiFXODU, ZKHQ XViQJ ZDWHU RU D ZDWHU-VROXEOH FOHDQiQJ DJHQW, EH FDUHiXO QRW WR OHDYH ZDWHU UHVigXHV3
 - (83 8ViQJ iQ WKH DWPRVSKUH ZKHUH VWUD\V DFiG RU DONDoiQH.
 - (93 8ViQJ iQ WKH DWPRVSKUH ZKHUH WKUH DUH H[FHVViYH YiEUDWiRQ DQG VKRFN.
- 嵇 3iHDVH DUUDQJH FiUFxiW GHViJQ IRU SUHYHQWiQJ iPSXOVH RU WUDQViWiRQDO YROWDJH.
- DR QRW DSS\ YROWDJH, ZKiFK H[FHHG WKH iX00 UDWHG YROWDJH ZKHQ WKH FDSDFiWRUV UHFHiYH iPSXOVH YROWDJH, iQVWDQDQHRXV KiJK YROWDJH, KiJK SXOVH YROWDJH HWF.
- 2XU SURGXFWV WKUH iV D SURGXFW DUH XViQJ DQ HOHFwURO\WH VROXWiRQ. 7KHUHIRUH, PiVXVH FDQ UHVXOW iQ UDSiG GHWHUiRUDWiRQ RI FKDUDEFWHUiVWiFV DQG iXQFWiRQV RI HDEF SURGXFW. (OHFWURO\WH OHNDNJH GDPDJH SuiQWHG FiUFxiW DQG DiIHFwV SHUIRUPDQFH, FKDUDEFWHUiVWiFV, DQG iXQFWiRQV RI FXVWRPHU V\VWHP.

! \$\$\$oiFDWiRQ JXiGH0iQHvقSDGiDO OHDG 7\SHك

1. &iUFXiW GHViJQ

1.1 2SHUDWiQJ WHPSHUDWXUH DQG IUHTXHQF\

(OHFWUiFDO FKDUDFWHUiVWiFV RI WKH FDSDFiWRU DUH OiNH0\ WR FKDQJH GXH WR YDUiDWiRQ iQ WHPSHUDWXUH DQG/RU IUHTXHQF\.

&iUFXiW GHViJQHUV VKRXOG WDNH WKHVV FKDQJHV iQWR FRQViGHUDWiRQ.

(13 (IIHFW RI RSHUDWiQJ WHPSHUDWXUH RQ HOHFWUiFDO SDUDPHWHUV

\$W KiJKHU WHPSHUDWXUH : OHNDNJH FXUUHQW DQG FDSDFiWDQFH iQFUHDVH ZKiOH HTXiYDOHQW VHUiHV UHViVWDQFH ((653 GHFUHDVHV.

\$W ORZHU WHPSHUDWXUH : OHNDNJH FXUUHQW DQG FDSDFiWDQFH GHFUHDVH ZKiOH HTXiYDOHQW VHUiHV UHViVWDQFH ((653 iQFUHDVHV.

(23 (IIHFW RI IUHTXHQF\ RQ HOHFWUiFDO SDUDPHWHUV

\$W KiJKHU IUHTXHQFiHV : FDSDFiWDQFH DQG iPSHGQFH GHFUHDVH ZKiOH WDQ G iQFUHDVHV.

\$W ORZHU IUHTXHQFiHV : KHDW JHQHUDWHG E\ UissoH FXUUHQW ZiOO UivH GXH WR DQ iQFUHDVH iQ HTXiYDOHQW VHUiHV UHViVWDQFH ((653.

1.2 2SHUDWiQJ WHPSHUDWXUH DQG OiH H[SHFWDQF\

(13 ([SHFWHG OiH iV DIIHFWHG E\ RSHUDWiQJ WHPSHUDWXUH. *HQHUD00\, HDFK 10 % UHGXFWiRQ iQ WHPSHUDWXUH ZiOO GRXE0H WKH H[SHFWHG OiH. 8VH FDSDFiWRUV DW WKH ORZHV SRVViEH WHPSHUDWXUH EH0RZ WKH XSSHU FDWHJR\ WHPSHUDWXUH.

(23 II RSHUDWiQJ WHPSHUDWXUH H[FHHG WKH XSSHU FDWHJR\ OiPiW, UDSiG GHWHUiRUDWiRQ RI HOHFWUiFDO SDUDPHWHU ZiOO RFFXU DQG iUUHYHUiEH GDPDJH ZiOO UHVXOW.

&KHFN IRU WKH PD[iPXP FDSDFiWRU RSHUDWiQJ WHPSHUDWXUH iQFOXGiQJ DPEiHQW WHPSHUDWXUH, iQWHUQDO FDSDFiWRU WHPSHUDWXUH UivH GXH WR UissoH FXUUHQW, DQG WKH HIIHFW RI UDGidWHG KHDW IURP SRZHU WUDQViVRUV, I&'V RU UHViVRUV.

\$YRiG SODFiQJ FRPSRQH0V, ZKiFK FRXOG FRQGXFV KHDW WR WKH FDSDFiWRU IURP WKH EDFN ViGH RI WKH FiUFXiW ERDUG.

(33 7KH IRUPXOD IRU FDOFXODWiQJ H[SHFWHG OiH DW ORZHU RSHUDWiQJ WHPSHUDWXUH iV DV IROORZV ;

$$\frac{71-72}{10} / 2 = / 1\frac{1}{2}$$

/1 *XDUDQWHG OiH (K3 DW WHPSHUDWXUH, 71 %

/2 %([SHFWHG OiH (K3 DW WHPSHUDWXUH, 72 %

71 *SSSHU FDWHJR\ WHPSHUDWXUH + WHPSHUDWXUH UivH GXH WR UDWHG UissoH FXUUHQW (%&3

72 *\$FWXDO RSHUDWiQJ WHPSHUDWXUH, DPEiHQW WHPSHUDWXUH + WHPSHUDWXUH UivH GXH WR UissoH FXUUHQW (%&3

(43 8ViQJ WKH FDSDFiWRU EH\RQG WKH HViPDWHG OiHWHiP ZiOO UHVXOW iQ VKRUW FiUFXiW, HOHFWURO\WH OHDN, YHQW RSHQ,

DQG ODUJH GHWHUiRUDWiRQ RI FKDUDFWHUiVWiFV. 7KH OiHWHiP FDOQRW JR DERYH 15 \HUV GXH WR DJiQJ RI VHDOIQJ UXEEHU.

1.3 &RPPRQ DSSoiFDWiRQ FRQGiWiRQV WR DYRiG

7KH IROORZiQJ PiVDSSoiFDWiRQ ORDG FRQGiWiRQV ZiOO FDXVH UDSiG GHWHUiRUDWiRQ RI D FDSDFiWRUV HOHFWUiFDO SDUDPHWHUV.

iQ DGGiWiRQ, UDSiG KHDWiQJ DQG JDV JHQHUDWiRQ ZiWiKi WKH FDSDFiWRU FDQ RFFXU, FDXViQJ WKH SUHVXUH UHOiHI YHQW

WR RSHUDWH DQG UHVXOWDQW OHNDNJH RI HOHFWURO\WH. 8QGHU H[WUHPH FRQGiWiRQV, H[SORViRQ DQG Iiuh iJQiWiRQ FRXOG UHVXOW.

7KH OHDNHG HOHFWURO\WH iV FRPEXVViEH DQG HOHFWUiFDO\ FRQGXFWiYH.

(13 5HYHUVH YROWDJH

D& FDSDFiWRUV KDYH SRODUiW\, 7KHUHIRUH, SOHDVH GR QRW DSSO\ WKH UHYHUVH YROWDJH. 9HUiI\ FRUHHFW SRODUiW\ EHIRUH iQVHUWiRQ.

)RU FiUFXiWV ZiWK FKDQJiQJ RU XQFHUWDiQ SRODUiW\, XVH D& EisRODU FDSDFiWRUV. D& EisRODU FDSDFiWRUV DUH QRW VXiWDEOH IRU XVH iQ \$& FiUFXiWV.

(23 &KDUJH / DiVFKDUJH DSSoiFDWiRQV

6WDQGUG FDSDFiWRUV DUH QRW VXiWDEOH IRU XVH iQ UHSHDWiQJ FKDUJH/GiVFKDUJH DSSoiFDWiRQV.)RU FKDUJH/GiVFKDUJH DSSoiFDWiRQV, FRQVXOW XV ZiWK \RXU DFWXDO DSSoiFDWiRQ FRQGiWiRQ.

)RU UXVK FXUUHQW, SOHDVH WR QRU H[FHHG 100 \$.

(33 21-2)) FiUFXiW

DR QRW XVH FDSDFiWRUV iQ FiUFXiW ZKHUH 21-2)) VZiWFKiQJ iV UHSHDWHG PRUH WKDQ 10000 WiPHV/SHU GD\.

iQ FDVH RI DSSoiQJ WR WKH WKHVV 21-2)) FiUFXiW, FRQVXOW ZiWK XV DERXW FiUFXiW FRQGiWiRQ DQG VR RQ.

(43 2YHU YROWDJH

DR QRW DSSO\ YROWDJHV H[FHHGiQJ WKH PD[iPXP VSHFiIHG UDWHG YROWDJH. 9ROWDJHV XS WR WKH VXUJH YROWDJH UDWiQJ DUH DFFHSWDEOH IRU VKRUW SHUIRGV RI WiPH.

(QVXUH WKDW WKH VXP RI WKH D& YROWDJH DQG WKH VXSHUiPSRVHG \$& UisSOH YROWDJH GRHV QRW H[FHHG WKH UDWHG YROWDJH.

(53 5iSSOH FXUHQW

DR QRW DSSO\ UisSOH FXUHQWV H[FHHGiQJ WKH PD[iPXP VSHFiIHG YDOXH.)RU KiJK UisSOH FXUHQW DSSoifDWiRQV, XVH D FDSDFiWRU GHViJQH IRU KiJK UisSOH FXUHQWV. IQ DGGiWiRQ, FRQVXOW XV iL WKH DSSoIHG UisSOH FXUHQW iV WR EH KiJKHU WKDQ WKH PD[iPXP VSHFiIHG YDOXH. (QVXUH WKDW UDWHG UisSOH FXUHQWV WKDW VXSHUiPSRVHG RQ ORZ D& EiDV YROWDJHV GR QRW FDXVH UHYHUVH YROWDJH FRQGiWiRQV.

(YHQ iL iW iV ZiWkiQ D UDWHG UisSOH FXUHQW, iQ FdVH WKH SUDFiWfD0 XVH iV RYHU WKH SUH GHVFUiEHG HQGXUDQFH 0iHWiPH, iW FDXVHV WKH iQFUDVH RI GHWHUiRUDWiRQ RI (65 FKDUFWHUiVWiF DQG WKH iQWHUQD0 JHQHUDWiRQ KHDW E\ UisSOH FXUHQW. DXH WR WKiV, WKHUH iV VRPH SRVViEioiW\ RI YHQW RSHQ, EXOJiQJ RI VOHHYH DQG UXEEHU, HOHFWURO\WH OHNDNDJH, DQG VKRW FiUFXiW, H[SORViRQ DQG iJQiWiRQ iQ WKH ZRUVV FdVH.

1.4 8ViQJ WZR RU PRUH FDSDFiWRUV iQ SDUDOOHO

(13 &DSDFiWRUV FRQQHFWHG iQ SDUDOOHO

7KH FiUFXiW UHVViVDQFH FDQ FORVHO\ DSSUR[iPDWH WKH VHUiHV UHVViVDQFH RI WKH FDSDFiWRU, FDXViQJ DQ iPEDODQFH RI UisSOH FXUHQW ORDGV ZiWkiQ WKH FDSDFiWRUV. &DUHX0 ZiUiQJ PHWKRGV FDQ PiQPi]H WKH SRVViEoH DSSoifDWiRQ RI DQ H[FHVViYH UisSOH FXUHQW WR D FDSDFiWRU.

(23 &DSDFiWRUV FRQQHFWHG iQ VHUiHV

DiIHUHQFHV iQ QRUPD0 D& OHNDNDJH FXUHQW DPRQJ FDSDFiWRUV FDQ FDXVH YROWDJH iPEDODQFHV.

7KH XVH RI YROWDJH GiYiGHU VKXQW UHVViWRUV ZiWK FRQViGHUDWiRQ WR OHNDNDJH FXUHQWV FDQ SUHYHQW FDSDFiWRU YROWDJH iPEDODQFHV.

127 (: 30HDVH GR QRW XVH iQ WKH VHUiHV iQ WKH FdVH RI FRQGXFWiYH SRO\PHU K\EUiG DOXPiQXP HOHFWURO\WIF FDSDFiWRU.

1.5 &DSDFiWRU PRXQWiQJ FRQViGHUDWiRQV

(13 DRXEOH-ViGHG FiUFXiW ERDUGV

\$YRiG ZiUiQJ SDWWHUQ UXQV, ZKiFK SDVV EHWZHHQ WKH PRXQWHG FDSDFiWRU DQG WKH FiUFXiW ERDUG.

:KHQ GiSSiQJ iQWR D VROGHU EDWK, DQ H[FHV VROGHU PD\ GHSRViW XQGHU WKH FDSDFiWRU E\ FDSiOODU\ DFWiRQ, FDXViQJ VKRUW FiUFXiW EHWZHHQ DQRGH DQG FDWKRGH WHUPiQD0V.

(23 &iUFXiW %RDUG +ROH 3RViWiRQiQJ

7KH YiQ\0 VOHHYH RI WKH FDSDFiWRU FDQ EH GDPDJHG iL VROGHU SDVVHV WKURXJK D OHDG KROH iQWR WKH VXEVTXHQW0\ SURFHVVG SDUWV.

6SHFiD0 FDUH ZKHQ ORFDWiQJ KROH SRViWiRQV iQ SUR[iPiW\ WR FDSDFiWRUV iV UHFRPPHQGHG.

(33 &iUFXiW %RDUG +ROH 6SDFiQJ

7KH VSDFiQJ RI FiUFXiW ERDUG KROHV VKRX0G PDWFK WKH OHDG ZiUH VSDFiQJ RI FDSDFiWRUV ZiWkiQ WKH VSHFiIHG WROHUDQFHV. IQFRUHFV VSDFiQJ FDQ FDXVH DQ H[FHVViYH OHDG ZiUH VWUHVV GXUiQJ WKH iQVHUWiRQ SURFHV.

7KiV PD\ UHVXOW iQ SUHPDWXUH FDSDFiWRU iDioxUH GXH WR WKH VKRUW RU RSHQ FiUFXiW, iQFUDVHG OHNDNDJH FXUHQW, RU HOHFWURO\WH OHNDNDJH.

(43 &HDUDQFH IRU FdVH PRXQWHG SUHVXUH UHOiHI

&DSDFiWRUV ZiWK FdVH PRXQWHG SUHVXUH UHOiHI UHTXiUH VXLiFiHQW FOHDUDQFH WR DOORZ IRU SURSHU SUHVXUH UHOiHI RSHUDWiRQ.

7KH PiQPiXP FOHDUDQFH DUH GHSHQGHQW RQ FDSDFiWRU GiDPHWHUV DV iROORZV.

(DiD 10 PP WR DiD 16 PP : 2 PP PiQPiXP, DiD 18 PP : 3 PP PiQPiXP)

(53 :iUiQJ QHDU WKH SUHVXUH UHOiHI

\$YRiG ORFDWiQJ KiJK YROWDJH RU KiJK FXUHQW ZiUiQJ RU FiUFXiW ERDUG SDWKV DERYH WKH SUHVXUH UHOiHI.

)ODPPDEOH, KiJK WHPSHUDWXUH JDV WKDW H[FHHGV 100 9& PD\ EH UHOHDVHG ZKiFK FRXOG GiVViROYH WKH ZiUH iQVXODWiRQ DQG iJQiWH.

(63 &iUFXiW ERDUG SDWWHUQV XQGHU WKH FDSDFiWRU

\$YRiG FiUFXiW ERDUG UXQV XQGHU WKH FDSDFiWRU, DV DQ HOHFWUiFD0 VKRUW FDQ RFFXU GXH WR DQ HOHFWURO\WH OHNDNDJH.

(73 30HDVH QRWH WKH UHVRQDQW DiWHU SURGXFW iPS0HPHQDWiRQ

7KH YiFiQW\ RI WKH UHVRQDQW SRiQW Zi00 WDNH D KHDY\ ORDQ RQ WKH FDSDFiWRU.

&DSDFiWRUV FDQ FDXVH UDSiG FKDQJH iQ FKDUFWHUiVWiFV DQG GURSXRW E\ WKiV ORDQ.

1.6 OHFWUiFD0 iVR0DWiRQ RI WKH FDSDFiWRU

&RPSOHWHO\ iVR0DWH WKH FDSDFiWRU DV iROORZV.

%HWZHHQ WKH FDWKRGH DQG WKH FdVH DQG EHWZHHQ WKH DQRGH WHUPiQD0 DQG RWKHU FiUFXiW SDWKV.

1.7 &DSDFiWRU 6OHhYH

7KH YiQ\O VOHHYH RU ODPiQDWH FRDWiQJ iV iQWHQGHG IRU PDUNiQJ DQG iGHQWiIiFDWiRQ SXUSRVHV DQG iV QRW PHDQW WR HOHFWUiFD00\ iQVXODWH WKH FDSDFiWRU.

7KH VOHHYH PD\ VSOiW RU FUDFN iI iPPHUVHG iQWR VROYHQWV VXFK DV WROXHQH RU [\OHQH DQG WKHQ VXEVTXHQWO\ H[SRVHG WR KiJK WHPSHDXUHV.

2. &DSDFiWRU KDQGOiQJ WHFKQiTXHV

2.1 &RQViGHUdWiRQV EHIRUH XViQJ

(13 &DSDFiWRUV KDYH D IiQiWH OiIH. DR QRW UHXVH RU UHF\FOH FDSDFiWRUV IURP XVHG HTXiSPHQW.

(23 7UDQViHQW UHFRYHU\ YROWDJH PD\ EH JHQHUDWHG iQ WKH FDSDFiWRU GXH WR GiHOHFWUiF DEVRUSWiRQ.

II UHTXiUHG, WKiV YROWDJH FDQ EH GiVFKDUJHG ZiWK D UHViVWRU ZiWK D YDOXH RI DERXW 1 N .

(33 &DSDFiWRUV VWRUHG IRU D ORQJ SHUiRG RI WiPH PD\ H[KiEiW DQ iQFUDVH iQ OHNDNDJH FXUUHQW.

7KiV FDQ EH FRUUHFWHG E\ JUDGXDOO\ DSSO\iQJ UDWHG YROWDJH iQ VHUihV ZiWK D UHViVWRU RI DSSUR[iPDWHO\ 1 N .

(43 II FDSDFiWRUV DUH GURSSHG, WKH\ FDQ EH GDPDJHG PHFKDQiFD00\ RU HOHFWUiFD00\, \$YRiG XViQJ GURSSHG FDSDFiWRUV.

(53 DHQWHG RU FUXVKHG FDSDFiWRUV VKRXOG QRW EH XVHG.

7KH VHDO iQWHJUiW\ FDQ EH GDPDJHG DQG ORVV RI HOHFWURO\WH/ VKRUWHQHG OiIH FDQ UHVXOW.

2.2 &DSDFiWRU iQVHUWiRQ

(13 9HUiI\ WKH FRUUHFw FDSDFiWDQFH DQG UDWHG YROWDJH RI WKH FDSDFiWRU.

(23 9HUiI\ WKH FRUUHFw SRODUiW\ RI WKH FDSDFiWRU EHIRUH iQVHUWiRQ.

(33 9HUiI\ WKH FRUUHFw WHUPiQDO GiPHQiRQ DQG ODQ SDWWHUQ Vi]H EHIRUH PRXQW WR DYRiG VWUHV RQ WKH WHUPiQDOV.

(43 (QVXUH WKDW WKH OHdG FoiQFKiQJ RSHUDWiRQ GRQH E\ DXWR iQVHUWiRQ HTXiSPHQWV GRHV QRW VWUHV WKH FDSDFiWRU OHdGV ZKHUH WKH\ HQWHU WKH VHDO RI WKH FDSDFiWRU.

2.3 JORZ 6ROGHUiQJ

(13 DR QRW iPPHUVH WKH FDSDFiWRU ERG\ iQWR WKH VROGHU EDWK DV H[FHVViYH iQWHUQDO SUHVXUH FRXOG UHVXOW.

(23 \$SSO\ SURSHU VROGHUiQJ FRQGiWiRQV (WHPSHDXUH, WiPH, HWF.3. DR QRW H[FHHG WKH VSHFiIiHG OiPiWV.

(33 DR QRW DOORZ RWKHU SDUUV RU FRPSRQHQWV WR WRXFK WKH FDSDFiWRU GXUiQJ VROGHUiQJ.

(43 5DGiD0 OHdG W\SH FDSDFiWRUV DUH QRW DOORZHG IRU WKH UHIORZ VROGHUiQJ.

2.4 ODQXD0 VROGHUiQJ

(13 \$SSO\ VROGHUiQJ FRQGiWiRQV (WHPSHDXUH DQG WiPH3 EDVHG RQ WKH VSHFiIiFDWiRQ, RU GR QRW H[FHHG WHPSHDXUH RI 350 1 IRU 3 VHFRRQV RU OHVV.

(23 II OHdG ZiUH PXXV EH PRGiIiHG WR PHHW WHUPiQDO ERDUG KROH VSDFiQJ, DYRiG VWUHV RQ WKH OHdG ZiUH ZKHUH iW HQWHU WKH FDSDFiWRU VHDO.

(33 II D VROGHUHG FDSDFiWRU PXXV EH UHPRYHG DQG UHiQVHUWHG, DYRiG H[FHVViYH VWUHV RQ WKH FDSDFiWRU OHdGV.

(43 \$YRiG SK\ViFD0 FRQWDFW EHWZHHQ WKH WiS RI WKH VROGHUiQJ iURQ DQG FDSDFiWRUV WR SUHYHQW PHOWiQJ RI WKH YiQ\O VOHHYH.

2.5 2WKHU 6ROGHUiQJ &RQViGHUdWiRQV

5DSiG WHPSHDXUH UiVH GXUiQJ WKH SUHKHDW RSHUDWiRQ DQG UHViQ ERQGiQJ RSHUDWiRQ FDQ FDXVH FUDFNiQJ RI WKH FDSDFiWRUbV YiQ\O VOHHYH.

)RU KHDW FXUiQJ, GR QRW H[FHHG 150 1 IRU WKH PD[iXP WiPH RI 2 PiQXWHV.

2.6 &DSDFiWRU KDQGOiQJ DIWHU VROGHUiQJ

(13 \$YRiG PRYiQJ WKH FDSDFiWRU DIWHU VROGHUiQJ WR SUHYHQW H[FHVViYH VWUHV RQ WKH OHdG ZiUH ZKHUH WKH\ HQWHU WKH VHDO. 7KH FDSDFiWRU PD\ EUHDN IURP HOHPHQW SRUWiRQ GXH WR D WRUTXH DW RXWHU UiP, FDXViQJ D ODUJH VWUHV WR WHUPiQDOV.

(23 DR QRW XVH WKH FDSDFiWRU DV D KDQGOH ZKHQ PRYiQJ WKH FiUFXiW ERDUG DVVHPEO\, 7KH WRWDO ZHiJKW RI WKH ERDUG ZRXOG DSSO\ WR HOHPHQW SRUWiRQ WKURXJK WHUPiQDOV, DQG WKH FDSDFiWRU PD\ EUHDN.

(33 \$YRiG VWUiniQJ WKH FDSDFiWRU DIWHU DVVHPEO\ WR SUHYHQW IDiXUH GXH WR H[FHVViYH VKRFN. 7KH FDSDFiWRU PD\ EUHDN GXH WR H[FHVViYH VKRFN RU ORDG DERYH VSHFiIiHG UDQJH.

2.7 &iUFXiW ERDUG FOHDQiQJ

(13 &iUFXiW ERDUGV FDQ EH iPPHUVHG RU XOWUDVRQiFD00\ FOHDQH XViQJ VXiWDEOH FOHDQiQJ VROYHQW IRU XS WR 5 PiQXWHV DQG XS WR 60 1 PD[iXP WHPSHDXUH. 7KH ERDUGV VKRXOG EH WKURXJKO\ UiQVHG DQG GuiHG. 7KH XVH RI R]RQH GHSHWiQJ FOHDQiQJ DJHQWV iV QRW UHFRPPHQGHG IRU WKH SXUSRVH RI SURWHFWiQJ RXU HQYiURQPHQW.

岩7DUJHW VROYHQW

3iQH \$OSKD 67-1006, \$TXD &OHdQHU 2106(3, &OHdQ-WKUX 750+ / 750 / 7100, 6XQHOHF %-12, 6XQHOHF %-12, &ROG &OHdQHU 33-375, 7HFKQR &OHdQHU 219, DK %H-FOHDU &:-5790, 7HOSHQH &OHdQHU (&-75, 7HFKQRFDUH)5:-17 /)5:-1 /)59-1

(23 \$YRiG XViQJ WKH IROORZiQJ VROYHQW JURXSV XQOHVV VSHFiFD00\ DOORZHG iQ WKH VSHFiFDWiRQ ;
(D3 +DORJHQDWHG FOHDQiQJ VROYHQWV ? H[FHSW IRU VROYHQW UHVivVDQW FDSDFiWRU W\SHV, KDORJHQDWHG VROYHQWV FDQ
SHUPHDWH WKH VHDO DQG FDXVH iQWHUQDO FDSDFiWRU FRUURViRQ DQG IDiOXUH.
)RU VROYHQW UHVivVDQW FDSDFiWRUV, FDUHIX00\ IROORZ WKH WHPSHUDWXUH DQG WiPH UHTXiUHPHQWV EDVHG RQ WKH
VSHFiFDWiRQ. 1,1,1-WUiFKORURHWKDKH VKRXOG QHYHU EH XVHG RQ DQ\ DOXPiQXP HOHFWURO\WiF FDSDFiWRU.
(E3 \$INDOiQH VROYHQWV ? FRXOG UHDFW DQG GiVvROYH WKH DOXPiQXP FdVH.
(F3 3HWUROHXP EDVHG VROYHQWV ? GHWHUiRUDWiRQ RI WKH UXEEHU VHDO FRXOG UHVX0W.
(G3 ;\OHQH ? GHWHUiRUDWiRQ RI WKH UXEEHU VHDO FRXOG UHVX0W.
(H3 \$FHWRRH ? UHPRYDO RI WKH iQN PDUNiQJV RQ WKH YiQ\0 VOHHYH FRXOG UHVX0W.
(33 \$ WKRURXJK GU\iQJ DIWHU FOHDQiQJ iV UHTXiUHG WR UHPRYH UHVigXD0 FOHDQiQJ VROYHQWV WKDW PD\ EH WUDSSHG
EHWZHHQ WKH FDSDFiWRU DQG WKH FiUFXiW ERDUG. \$YRiG GU\iQJ WHPSHUDWXUH, ZKiFK H[FHHG WKH XSSHU FDWHJR\ \
WHPSHUDWXUH RI WKH FDSDFiWRU.
(43 ORQiWRU WKH FRQWDPiQDWiRQ OHYHOV RI WKH FOHDQiQJ VROYHQWV GXUiQJ XVH iQ WHUPV RI HOHFWUiFD0 FRQGXFWiYiW\,
S+, VSHFiF JUDYiW\, RU ZDWHU FRQWHQW.
&KORUiQH OHYHOV FDQ UivH ZiWK FRQWDPiQDWiRQ DQG DGYHUVHO\ DIHFW WKH SHUIRUPDQFH RI WKH FDSDFiWRU.
&RQWURO WKH IOX[GHQWiW\ iQ WKH FOHDQiQJ DJHQW WR EH OHVV WKDQ 2 PDVV%.
(53 DSHHQGiQJ RQ WKH FOHDQiQJ PHWKRg, WKH PDUNiQJ RQ D FDSDFiWRU PD\ EH HUDVHG RU EOXUHG.
30HDVH FRQVX0W XV iL \RX DUH QRW FHUWDiQ DERXW DFFHSWDEOH FOHDQiQJ VROYHQWV RU FOHDQiQJ PHWKRgV.

2.8 ORXQWiQJ DGKHViYHV DQG FRDWiQJ DJHQW

:KHQ XViQJ PRXQWiQJ DGKHViYHV RU FRDWiQJ DJHQWV WR FRQWURO KXPiGiW\, DYRiG XViQJ PDWHUiDOV FRQWDiQiQJ
KDORJHQDWHG VROYHQWV.
\$0VR, DYRiG WKH XVH RI FKORURSUHQH EDVHG SRO\PHUV.
+DUGHQ RQ GU\ DGKHViYH RU FRDWiQJ DJHQWV ZH00 OHVV WKH VROYHQW VKRXOG EH OHiW.
\$iWHU DSS0\iQJ DGKHViYHV RU FRDWiQJ, GU\ WKRURXJK0\ WR SUHYHQW UHVigXD0 VROYHQWV IURP EHiQJ WUDSSHG EHWZHHQ
WKH FDSDFiWRU DQG WKH FiUFXiW ERDUG.

2.9)XPiJDWiRQ

iQ H[SRUiQJ HOHFWURQiF DSS0iDQFHV ZiWK DOXPiQXP HOHFWURO\WiF FDSDFiWRUV, iQ VRPH FdVHV iXPiJDWiRQ WUHDWPHQW
XViQJ VXFk KDORJHQ FRPSRXQG DV PHWK\0 EURPiGH iV FRQGXFWHG IRU ZRRGHQ ER[HV.
ii VXFk ER[HV DUH QRW GuiHG ZH00, WKH KDORJHQ OHiW iQ WKH ER[iV GiVSHUVHG ZKiOH WUDQVSRUWHG DQG HQWHUV iQ WKH
FDSDFiWRUV iQViGH.
7KiV SRViEO\ FDXVH HOHFWUiFD0 FRUURViRQ RI WKH FDSDFiWRUV. 7KHUHiRUH, DIWHU SHUIRUPiQJ iXPiJDWiRQ DQG GU\iQJ
PDNH VXUH WKDW QR KDORJHQ iV OHiW.
DRQW SHUIRUP iXPiJDWiRQ WUHDWPHQW WR WKH ZKROH HOHFWURQiF DSS0iDQFHV SDFNHG iQ D ER[.
/HDYH PRUH WKDQ 1/3 RI WKH VHDOiQJ SRUiWiRQ RSHQ, DQG GR QRW FRYHU WKDW SRUiWiRQ ZiWK DQ\ DGKHViYHV RU FRDWiQJ.

2.10)OX[

ii \RX XVH D KDORJHQ W\SH (&KORUiQH W\SH, %URPiQH W\SH, HWF.3 KiJK-DFWiYiW\ IOX[, SOHDVH XVH iW DIWHU FRQiUPDWiRQ
iQ DGYDQFH, DV iW PD\ KDYH DQ iPSDFW RQ SHUIRUPDQFH DQG UHOiDei0iW\ RI WKiV SURGXFW GXH WR WKH UHVigXH RI WKH IOX[.

3. 3UHFDXWiRQV IRU XViQJ FDSDFiWRUV

3.1 (QYiURQPHQW0 FRQGiWiRQV

&DSDFiWRUV VKRXOG QRW EH VWRUHG RU XVHG iQ WKH IROORZiQJ HQYiURQPHQWV.
(13 ([SRVXUH WR WHPSHUDWXUH DERYH WKH XSSHU FDWHJR\ \ RU EHORZ WKH ORZHU FDWHJR\ \ WHPSHUDWXUH RI WKH FDSDFiWRU.
(23 DiUHFw FRQWDFW ZiWK ZDWHU, VDOW ZDWHU, RU Ri0.
(33 +iJK KXPiGiW\ FRQGiWiRQV ZKHUH ZDWHU FRXOG FRQGHQVH RQ WKH FDSDFiWRU.
(43 ([SRVXUH WR WR[iF JDVHV VXFk DV K\GURJHQ VX0iGH, VX0iXiF DFiG, QiWUiF DFiG, FKORUiQH, FKORUiQH FRPSRXQG,
EURPiQH, EURPiQH FRPSRXQG RU DPPrQiD.
(53 ([SRVXUH WR R]RQH, UDGiDWiRQ, RU XOWUDYiROHW UD\V.
(63 9iEUDWiRQ DQG VKRFN FRQGiWiRQV H[FHHGiQJ VSHFiLiHG UHTXiUHPHQWV.
(YHQ ZiWkiQ WKH VSHFiLiHG UHTXiUHPHQWV, D ODUJH YieUDWiRQ DFFHOUDWiRQ PD\ EH DSS0iHG GXH WR UHVRQDQFH,
VR EH VXUH WR HYDOXDWH DQG FRQiUP ZiWK WKH DFWXD0 SURGXFW.

3.2 (OHFWUiFD0 SUHFDXWiRQV

(13 \$YRiG WRXFKiQJ WKH WHUPiQDOV RI D FDSDFiWRU DV D SRViEOH HOHFWUiF VKRFN FRXOG UHVX0W. 7KH H[SRVHG
DOXPiQXP FdVH iV QRW iQVXODWHG DQG FRXOG DOVR FDXVH HOHFWUiF VKRFN iL WRXFKHG.
(23 \$YRiG VKRUW FiUFXiWiQJ WKH DUHD EHWZHHQ WKH FDSDFiWRU WHUPiQDOV ZiWK FRQGXFWiYH PDWHUiDOV iQFOXGiQJ OiTXiGV
VXFk DV DFiGV RU DONDOIQH VROXWiRQV.
(33 \$ ORZ-PROHF0DU-ZHiJKW-VKiUR[DQH ZKiFK iV iQF0XGHG iQ D Vi0iFRQ PDWHUiD0 VKD00 FDXVHV DEQRUPDO HOHFWUiFD0
FKDUDFWHuivViFV.

4. (PHUJHQF\ SURFHGXUHV

(13 II WKH SUHVXXUH UHOiHI RI WKH FDSDFiWRU RSHUDWHV, iPPHGidWHO\ WXUQ RII WKH HTXiSPHQW DQG GiVFRQQHFW IURP WKH SRZHU VRXUFH.
7KiV Zi00 PiQiPi]H DQ DGGiWiRQDO GDPDJH FDXVHG E\ WKH YDSRui]iQJ HOHFWURO\WH.
(23 \$YRiG FRQWDFW ZiWK WKH HVFDSiQJ HOHFWURO\WH JDV, ZKiFK FDQ H[FHHG 100 % WHPSHUDWXUHV.
II HOHFWURO\WH RU JDV HQWHUV WKH H\H, iPPHGidWHO\ IOXVK WKH H\H ZiWK ODUJH DPRXQWV RI ZDWHU.
II HOHFWURO\WH RU JDV iV iQJHVWHG E\ PRXWK, JDUJOH ZiWK ZDWHU.
II HOHFWURO\WH FRQWDFWV WKH VNiQ, ZDVK ZiWK VRDS DQG ZDWHU.

5. /RQJ WHUP VWRUDJH

(13 /HDNDJH FXUUHQW RI D FDSDFiWRU iQFUHDVHV ZiWK ORQJ VWRUDJH WiPHV. 7KH DOXPiQXP R[iGH i0P GHWHUiRUDWHV DV D IXQFWiRQ RI WHPSHUDWXUH DQG WiPH.
II XVHG ZiWKRXW UHFRQGiWiRQiQJ, DQ DEQRUPDOO\ KiJK FXUUHQW Zi00 EH UHTXiUHG WR UHVWRUH WKH R[iGH iOP.
7KiV VXUJH FXUUHQW FRXOG FDXVH WKH FiUXiW RU WKH FDSDFiWRU WR Idi0.
([SiUDWiRQ GDWH iV 42 PRQWKV IURP RXWJRiQJ iQVSHFWiRQ GDWH.
+RZHYHU, H[SiUDWiRQ GDWH IRU VHUihV ZKiFK DUH QRW OiVWHG EHORZ iV 12 PRQWKV IURP RXWJRiQJ iQVSHFWiRQ GDWH.

6HUiHV	([SiUDWiRQ GDWH
)&,)K, +D, 7\$, 73	42 PRQWKV IURP RXWJRiQJ iQVSHFWiRQ GDWH

) RU VWRUDJH FRQGiWiRQ, NHHS URRP WHPSHUDWXUH (5 % WR 35 %3 DQG KXPiGiW\ (45 % WR 85 %3 ZKHUH GiUHFw VXQVKiQH GRHVQ'W UHDFK.

ق2ك(QYiURQPHQWDO &RQGiWiRQV
DR QRW VWRUH XQGHU FRQGiWiRQ RXWViGH WKH DUHD GHVFUiEHG iQ WKH VSHFiIiFDWiRQ, DQG DOVR XQGHU FRQGiWiRQV OiVWHG EHORZ.
(D3 ([SRVXUH WR WHPSHUDWXUHV DERYH WKH XSSHU FDWHJRU\ RU EHORZ WKH ORZHU FDWHJRU\ WHPSHUDWXUH RI WKH FDSDFiWRU.
(E3 DiUHFw FRQWDFW ZiWK ZDWHU, VDOW ZDWHU, RU Ri0.
(F3 +iJK KXPiGiW\ FRQGiWiRQV ZKHUH ZDWHU FRXOG FRQGHQVH RQ WKH FDSDFiWRU.
(G3 ([SRVXUH WR WR[iF JDVHV VXFk DV K\GURJHQ VXOiIGH, VXOiXUiF DFiG, QiWUiF DFiG, FKORUiQH, &KORUiQH FRPSRXQG, %URPiQH, %URPiQH FRPSRXQG RU DPPRQiD.
(H3 ([SRVXUH WR R]RQH, UDGiDWiRQ, RU XOWUDYiROHW UD\V.
(I3 9iEUDWiRQ DQG VKRFN FRQGiWiRQV H[FHHGiQJ VSHFiIiHG UHTXiUHPhQWV.

6. &DSDFiWRU GiVSRVDO

:KHQ GiVSRViQJ FDSDFiWRUV, XVH RQH RI WKH iROORZiQJ PhWKRGV.
(13 iQFiQHudWH DiWHU FUXVKiQJ WKH FDSDFiWRU RU SXQFWXUiQJ WKH FDQ ZDOO (WR SUHYHQW H[SORViRQ GXH WR iQWHUQDO SUHVXXUH UiVH3.
(23 DiVSRVH DV VROiG ZDVWH.
127(: /RFDO ODZV PD\ KDYH VSHFiIiF GiVSRVDO UHTXiUHPhQWV ZKiFK PXVW EH iROORZHG.

7KH SUHFDXWiRQV iQ XViQJ D0XPiQXP HOHFWURO\WiF FDSDFiWRUV iROORZ WKH "6DIHW\ DSSOiFDWiRQ JXiGH IRU WKH XVH iQ I[HGD0XPiQXP HOHFWURO\WiF FDSDFiWRUV IRU HOHFWURQiF HTXiSPHQW", 5&5-2367D iVVXHG E\ J(I7\$ iQ 2FWREHU 2017.
30HDVH UHiHU WR WKH DERYH DSSOiFDWiRQ JXiGH IRU GHWDiOV.