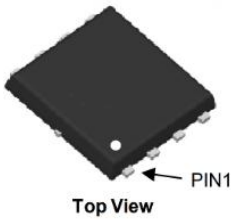
P-Channel Enhancement Mode MOSFET

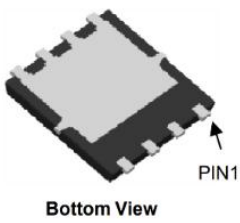
Features

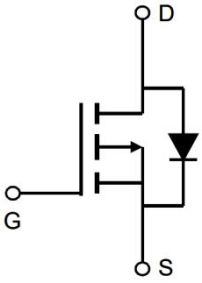
- Very Low On-resistance RDS(ON)
- Low Crss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

Application

- PWM Application
- Load Switch
- Power Management







PDFN3x3-8L
Marking: 15P03Q
Date Code: YWWXXX

Halogen-Free & Lead-Free

100% EAS Test

100% Rg Test

Absolute Maximum Ratings (at T_a = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	Tc = 25℃	I_D	-30	A
	Tc = 100℃		-19	
Peak Drain Current, Pulsed[3]		I_{DM}	-120	A
Avalanche Current		I_{AS}	-29	A
Single Pulse Avalanche Energy[2]		E_{AS}	42	mJ
Power Dissipation	Tc = 25℃	P_{tot}	25	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.3	℃/W
Thermal Resistance from Junction to Ambient [1]	$R_{\theta JA}$	50	℃/W

Note:
1). Device mounted on FR4 Board substrate PC board, 2OZ copper, with 1-inch square copper plate in still air , t≤10 sec.
2). Limited by T_{Jmax}, starting TJ=25°C, I_D=-29A, V_{GS}=10V, L=0.1mH, Rg=25Ω.
3). Pulse test: Pulse width ≤100μs, Duty cycle ≤2%. Repetitive rating, pulse width limited by T_{Jmax}=150°C

Characteristics at Ta = 25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = -250 μA	BV_{DSS}	-30			V
Drain-Source Leakage Current at V_{DS} = -30 V	I_{DSS}			-1	μA
Gate Leakage Current at V_{GS} = ± 20 V	I_{GSS}			±100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, I_D =- 250 μA	$V_{GS(th)}$	-1.2		-2.5	V
Drain-Source On-State Resistance at V_{GS} = -10 V, I_D = -10 A at V_{GS} = -4.5 V, I_D = -5 A	$R_{DS(on)}$		12 18	16 23	mΩ
DYNAMIC PARAMETERS					
Gate Resistance at V_{GS} =0V, V_{DS} = 0V, f = 1MHz	Rg		5.1		Ω
Forward Transconductance at V_{DS} =-3V, I_D =10mA	g_{fs}		15		S
Input Capacitance at V_{GS} = 0 V, V_{DS} = -20 V, f = 1 MHz	C_{iss}		2143		pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = -20 V, f = 1 MHz	C_{oss}		277		pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} =- 20 V, f = 1 MHz	C_{rss}		242		pF
Gate charge total at V_{DS} =- 20V, I_D =- 20 A, V_{GS} =- 10 V at V_{DS} =- 20V, I_D =- 20 A, V_{GS} =- 4.5 V	Q_g		42 19		nC
Gate to Source Charge at V_{DS} = -20 V, I_D = -20 A, V_{GS} = -10 V	Q_{gs}		8.5		nC
Gate to Drain Charge at V_{DS} = -20 V, I_D = -20 A, V_{GS} = -10 V	Q_{gd}		5.5		nC
Turn-On Delay Time at V_{GS} = -10 V, V_{DD} = -20 V, I_D = -10 A, R_g = 3.3 Ω	$t_{d(on)}$		14		ns
Turn-On Rise Time at V_{GS} = -10 V, V_{DD} = -20 V, I_D = -10 A, R_g = 3.3 Ω	t_r		26		ns
Turn-Off Delay Time at V_{GS} = -10 V, V_{DD} = -20 V, I_D = -10 A, R_g = 3.3 Ω	$t_{d(off)}$		27		ns
Turn-Off Fall Time at V_{GS} = -10 V, V_{DD} = -20 V, I_D = -10 A, R_g = 3.3 Ω	t_f		5		ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I_S = -1 A, V_{GS} = 0 V	V_{SD}			-1.2	V
Body Diode Reverse Recovery Time at Is = -10 A, di/dt = 100 A / μs	t_{rr}		14.4		ns
Body Diode Reverse Recovery Charge at I_S = -10 A, di/dt = 100 A / μs	Q_{rr}		9.4		nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

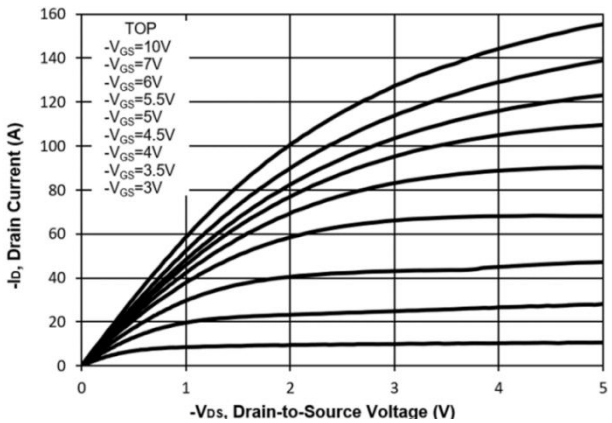


Fig. 2 Typical Transfer Characteristic

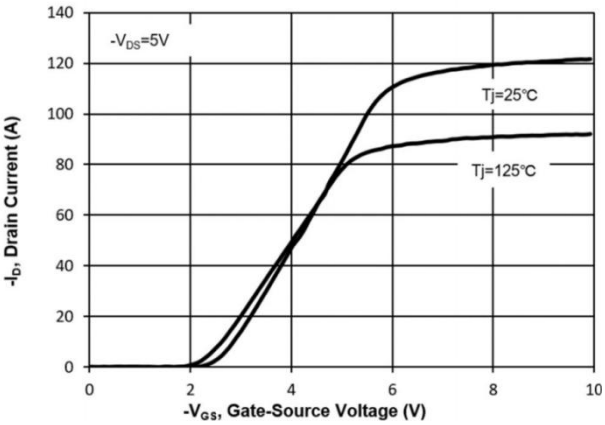


Fig. 3 On-Resistance vs. Drain Current

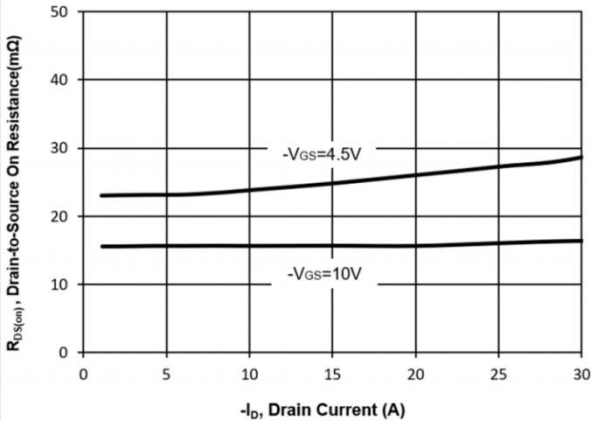


Fig. 4 On-Resistance vs. Gate Voltage

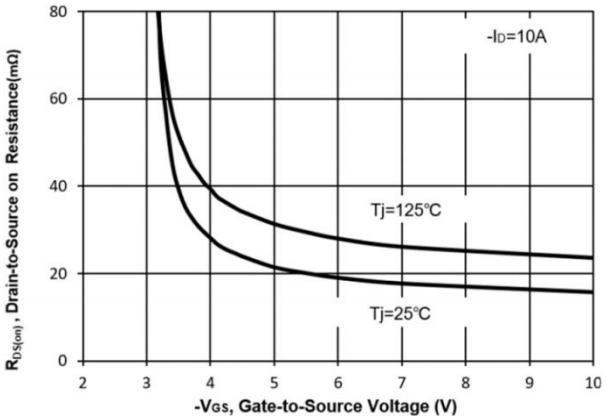


Fig. 5 On-Resistance vs.T_j

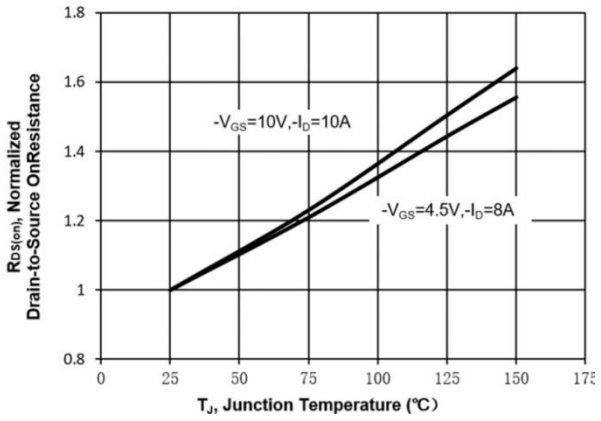
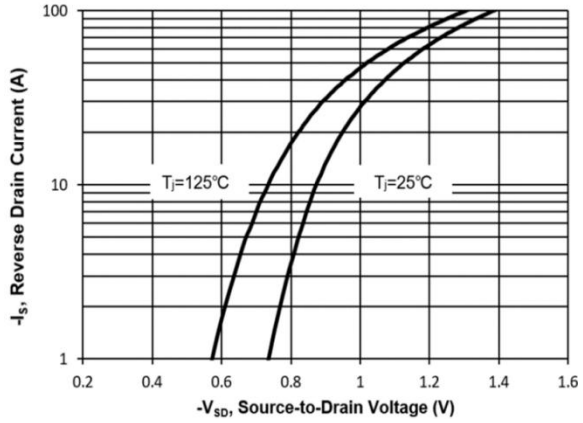


Fig. 6 Typical Forward Characteristic



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

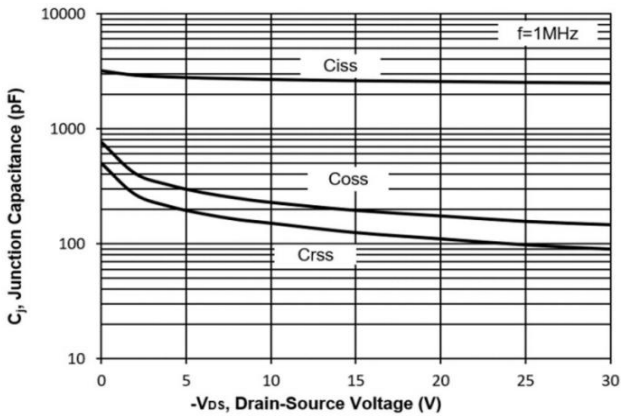


Fig. 8 Drain-Source Leakage Current vs. T_j

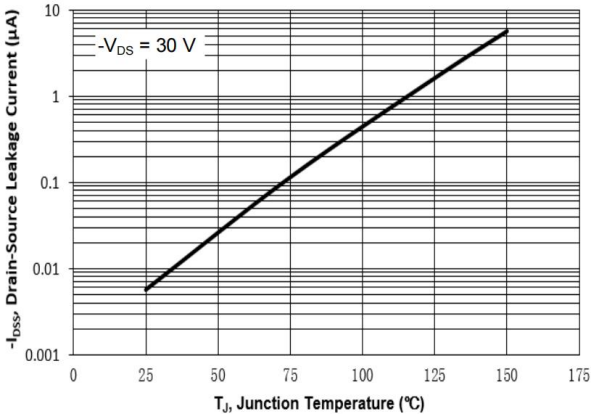


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

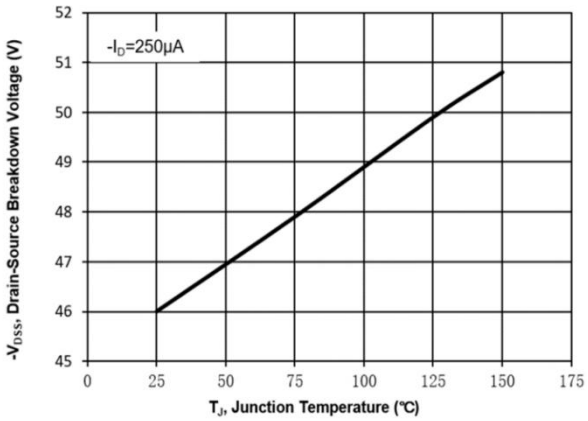


Fig. 10 Gate Threshold Variation vs. T_j

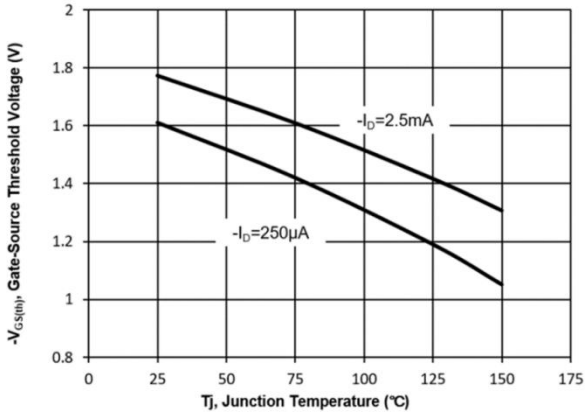


Fig. 11 Gate Charge

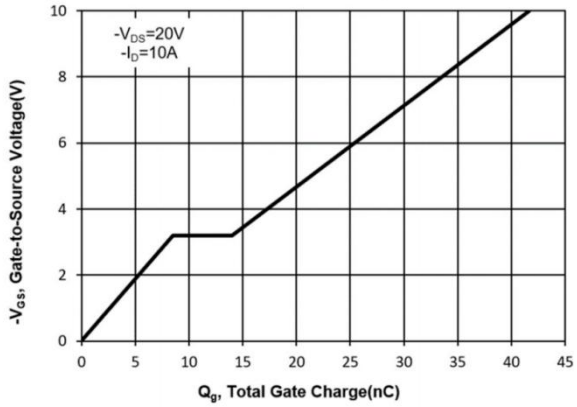
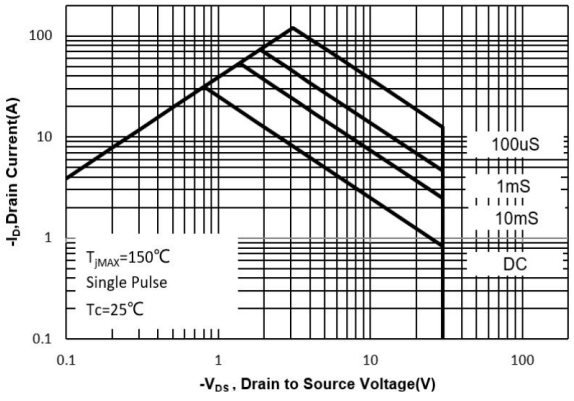


Fig. 12 Safe Operation Area



Electrical Characteristics Curves

Fig.13 Normalized Maximum Transient Thermal Impedance($z_{\theta JC}$)

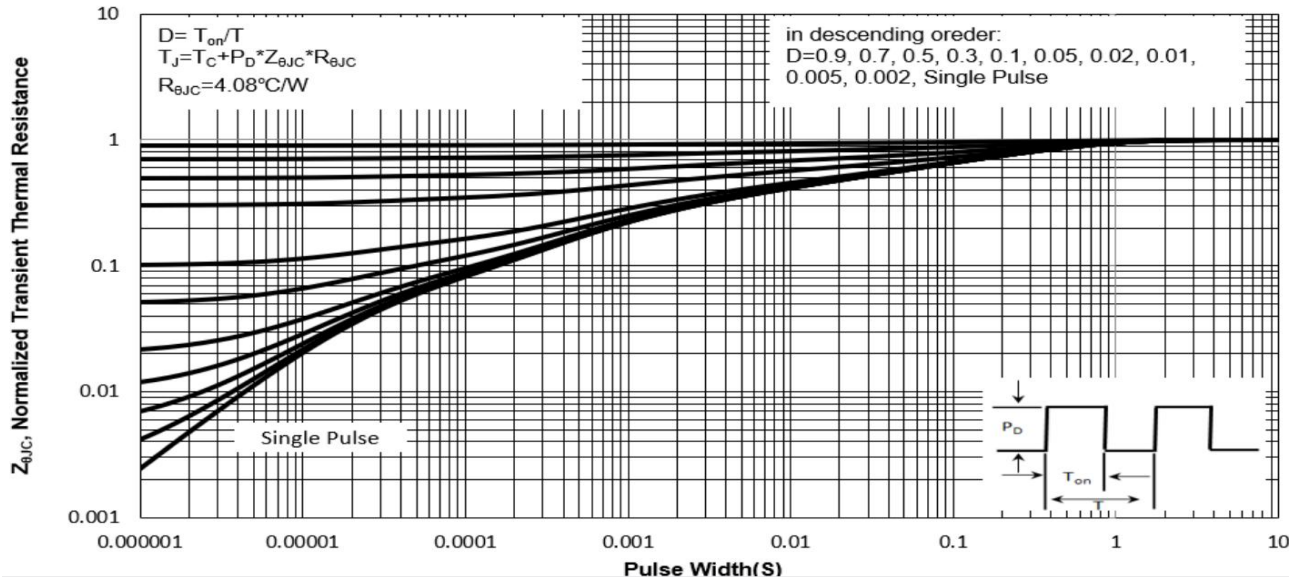
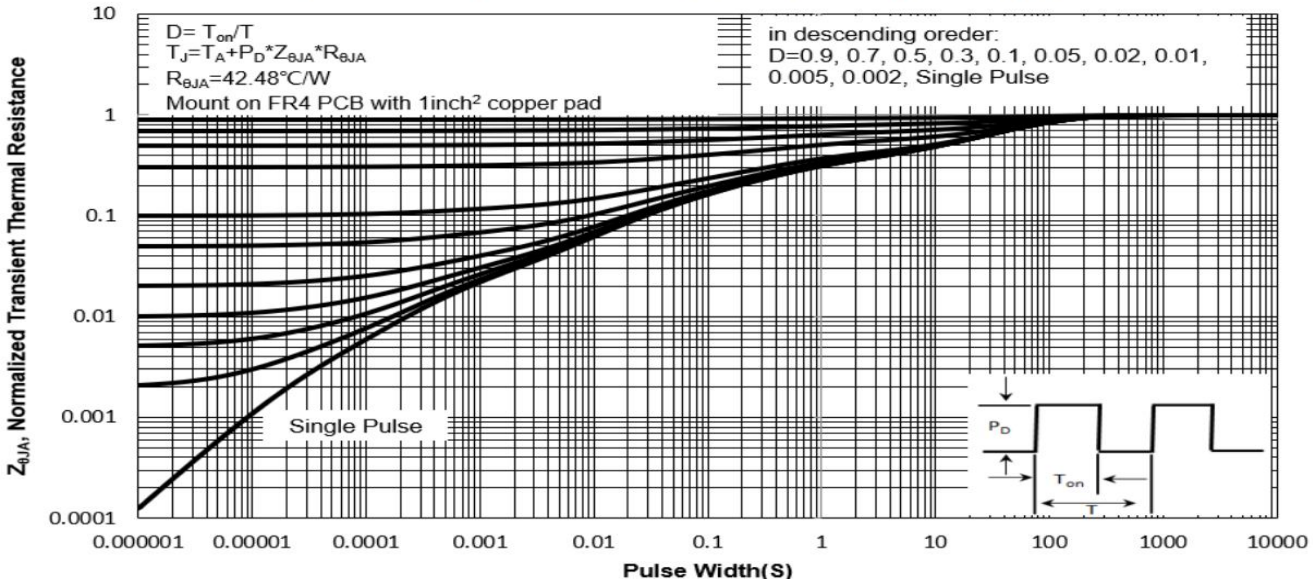


Fig.14 Normalized Maximum Transient Thermal Impedance($z_{\theta JA}$)



Test Circuits

Fig.1-1 Switching times test circuit

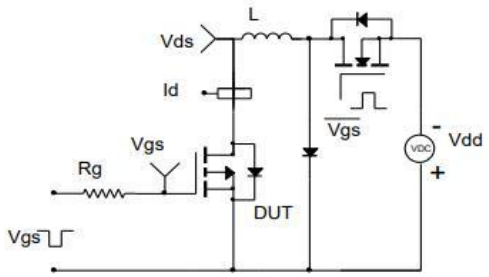


Fig.1-2 Switching Waveform

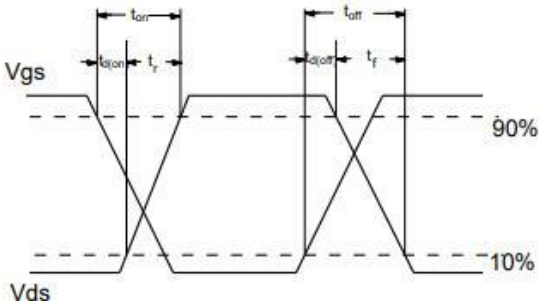


Fig.2-1 Gate charge test circuit

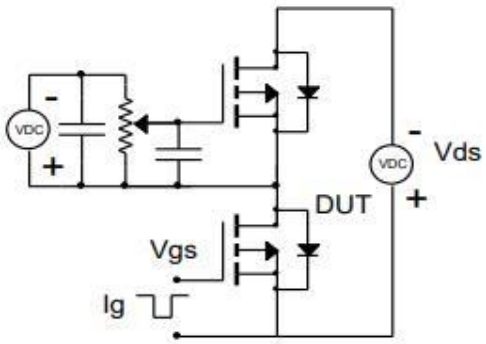


Fig.2-2 Gate charge waveform

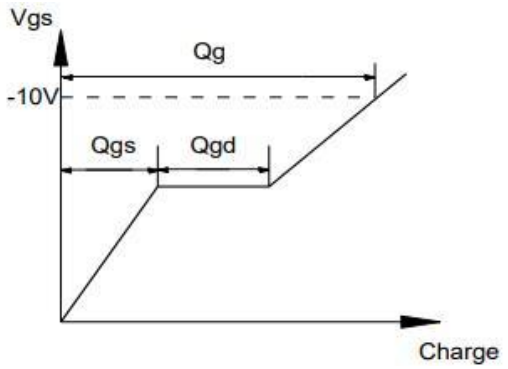


Fig.3-1 Avalanche test circuit

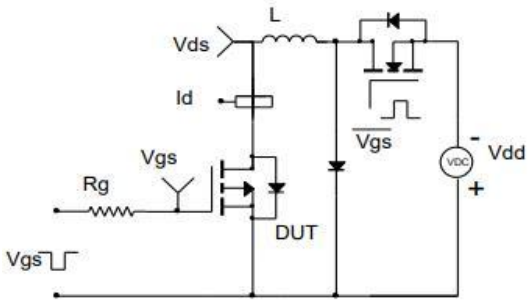
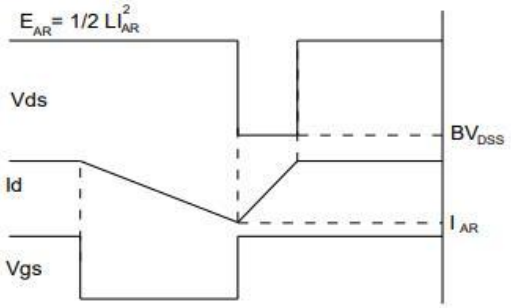
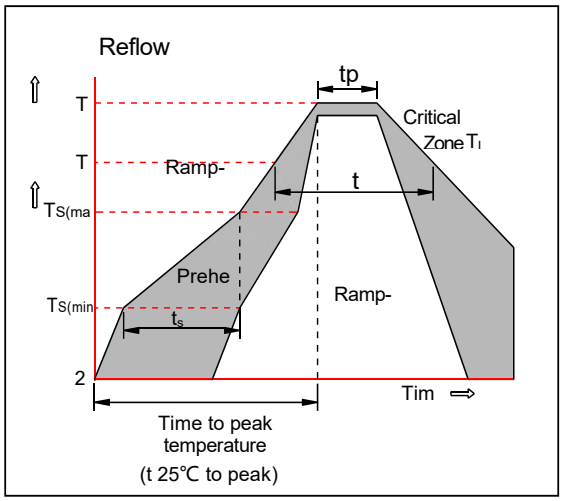


Fig.3-2 Avalanche waveform



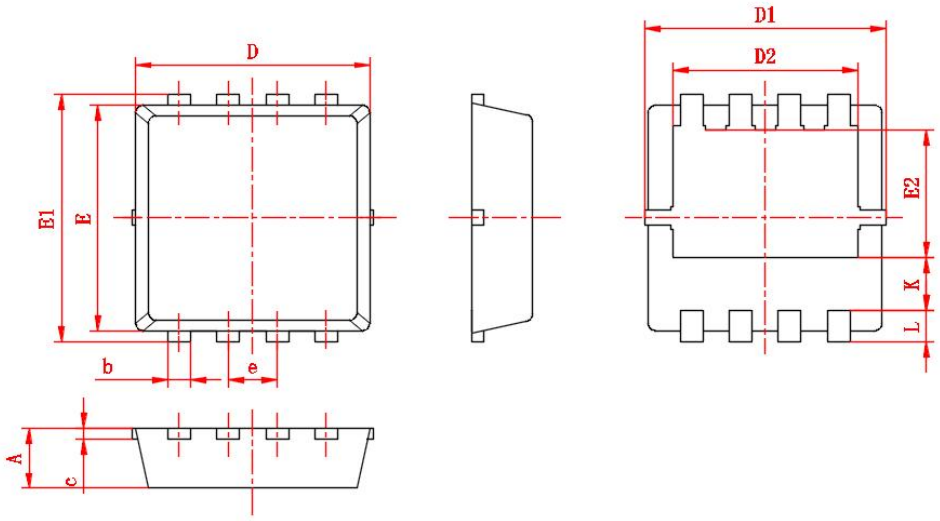
Soldering parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃



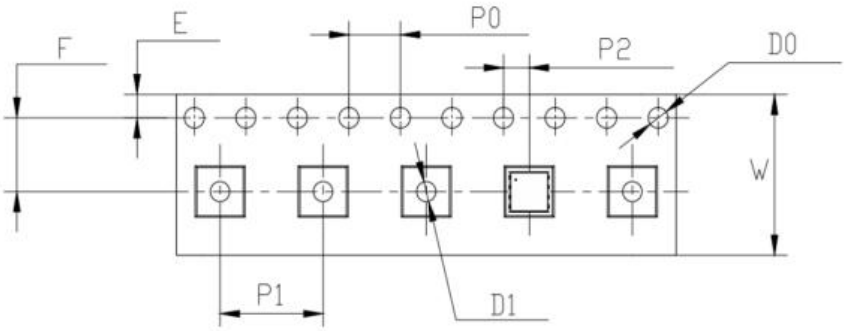
Package Outline Dimensions (Units: mm)

PDFN3x3-8L

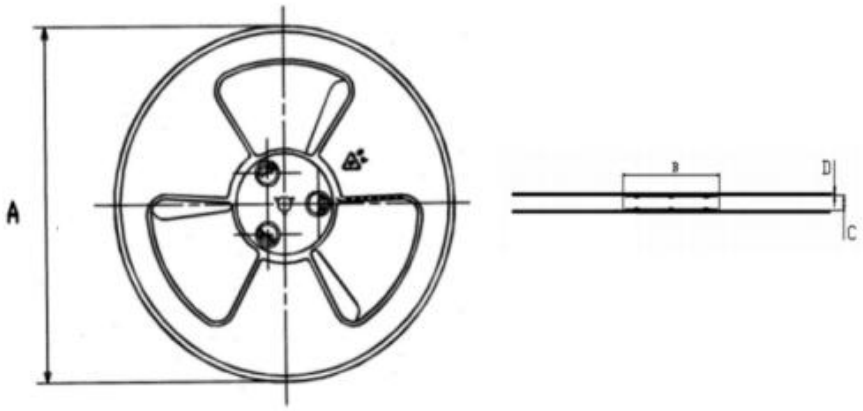


符号	尺寸		符号	尺寸		符号	尺寸	
	Min	Max		Min	Max		Min	Max
A	0.7	0.9	E	2.9	3.1	e	(0.65)	
D	3.0	3.2	E1	3.1	3.5	b	0.25	0.35
D1	3.0	3.4	E2	1.55	1.95	c	0.1	0.2
D2	2.25	2.65	K	(0.65)		L	0.3	0.55

Emboss Carrier Tape&Reel



Symbol Tape	Dimension in Millimeters
D0	1.50+0.10/-0.00
E	1.75±0.10
F	5.50±0.10
P0	4.00±0.10
P1	8.00±0.10
P2	2.00±0.10
W	12.00+0.3/-0.1



Unit:mm

Symbol	A	B	C	D	
通用尺寸	Ø331.00	101.0	13.0	2.10	
公差	±1	±2	±0.5	±0.2	

Contact Information

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