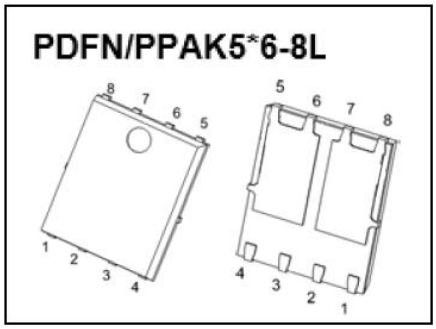
CHONGQING CLOUDCHILD TECHNOLOGY CO., LTD

PDFN/PPAK5*6-8L Plastic-Encapsulate MOSFETS

CCM2E60N04S N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$TYP	I_D
40 V	4.0mΩ@10V	60A
	5.0mΩ@4.5V	



DESCRIPTION

The CCM2E60N04S uses advanced SGT technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications .

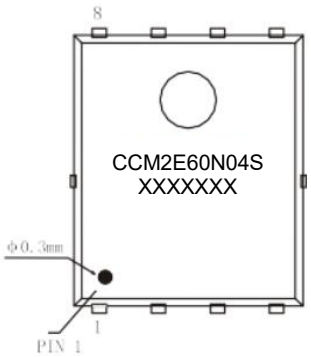
FEATURES

- Split Gate Trench Technology
- Low RDS(ON)
- Low Gate Charge
- Low Gate Resistance
- AEC Q101 qualified

APPLICATIONS

- Motors,lamps and solenoid control
- Transmission control
- Power switching application

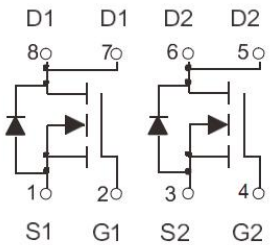
MARKING



CCM2E60N04S =Part No.

XXXXXXX = Code.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS(T_c=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current[1]	I_D	60	A
Pulsed Drain Current[2]	I_{DM}	240	A
Single Pulse Avalanche Energy[3]	E_{AS}	225	mJ
Total Power Dissipation[1]	P_D	83	W
Thermal Resistance from Junction to Case[1]	$R_{\theta JC}$	1.8	℃/W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~ +175	℃
Soldering Temperature , for 10S(1.6mm from case)	-	260	℃

Notes:

1. Current is limited by package; with a Rthjc = 1.8 ℃/W the chip is able to carry 99 A at 25°C.
2. P_W≤10μs, Duty cycle≤1%.
3. EAS condition: V_{DD}=25V,V_{GS}=10V,,IAS=30A, L=0.5mH, R_g=25Ω Starting T_J =25°℃.

MOSFET ELECTRICAL CHARACTERISTICS

TC=25℃ unless otherwise specified

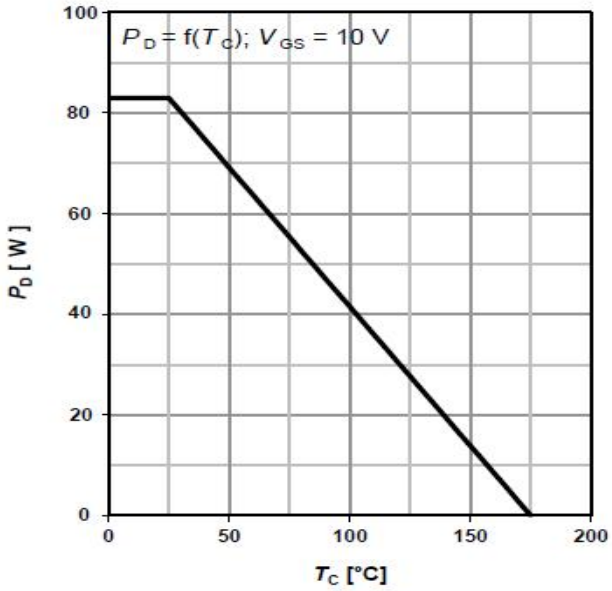
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)\,DSS}$	V_{GS} = 0V, I_D =250μA	40			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =32V, V_{GS} =0V			1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V			±100	nA
On characteristics[4]						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.5	1.7	3.0	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =10A		4.0	5.0	mΩ
		V_{GS} =4.5V, I_D =10A		5.0	6.5	mΩ
Forward transconductance	g_{Fs}	V_{DS} =10V, I_D =10A		100		S
Dynamic characteristics[34]						
Input capacitance	C_{iss}	V_{DS} =25V,V_{GS} =0V, f =1MHz		2260		pF
Output capacitance	C_{oss}			625		
Reverse transfer capacitance	C_{rss}			34		
Gate resistance	R_g	V_{DS} = 0V, V_{GS} = 0V,f =1MHz		4		Ω
Switching characteristics [34]						
Total gate charge	Q_g	V_{GS}=10V, V_{DD}=20V, I_D=20A		31		nC
Gate-source charge	Q_{gs}			6		
Gate-drain charge	Q_{gd}			3.8		
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V,R_L=1Ω , V_{GS}=10V,R_G=3Ω		7		ns
Turn-on rise time	t_r			2.8		
Turn-off delay time	$t_{d(off)}$			24		
Turn-off fall time	t_f			3.9		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage[4]	V_{SD}	V_{GS} =0V, I_S=10A			1.2	V
Continuous drain-source diode forward Current[1]	Is	-			60	A
Pulsed drain-source diode forward current[2]	I_{SM}	-			240	A
Reverse recovery time	Trr	I_F=60A，dI/dt=100A/us		26		ns
Reverse recovery charge	Qrr			28		nC

Note :

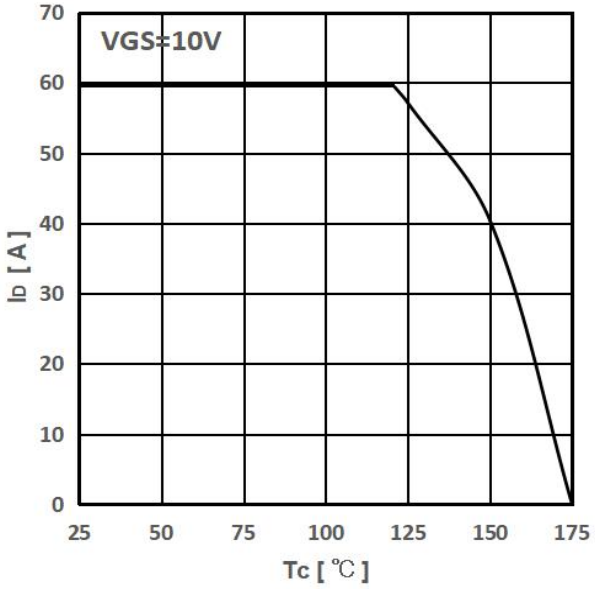
1.Current is limited by package; with a Rthjc = 1.8 ℃/W the chip is able to carry 99 A at 25°C.
2.P_W≤10μs, Duty cycle≤1%.
3.Guaranteed by design, not subject to production.
4.Pulse Test : Pulse Width≤300μs, duty cycle≤2%.

Typical Characteristics

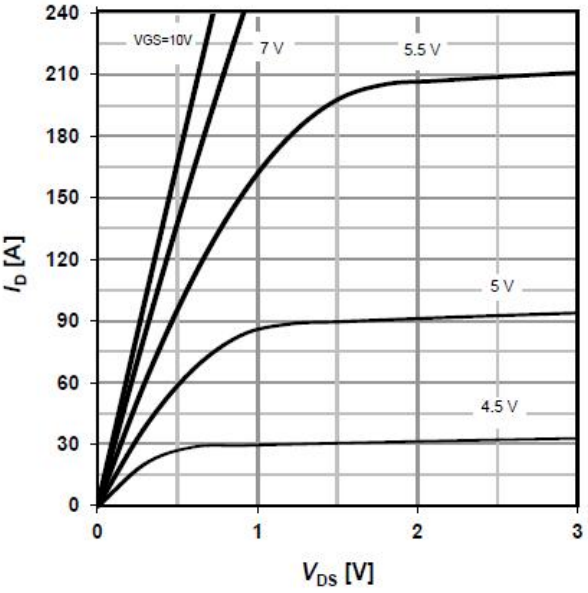
PD -- Tc



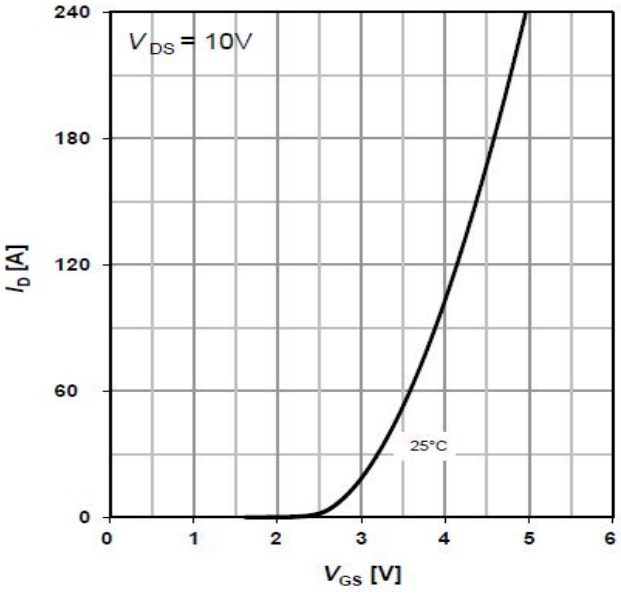
ID -- Tc



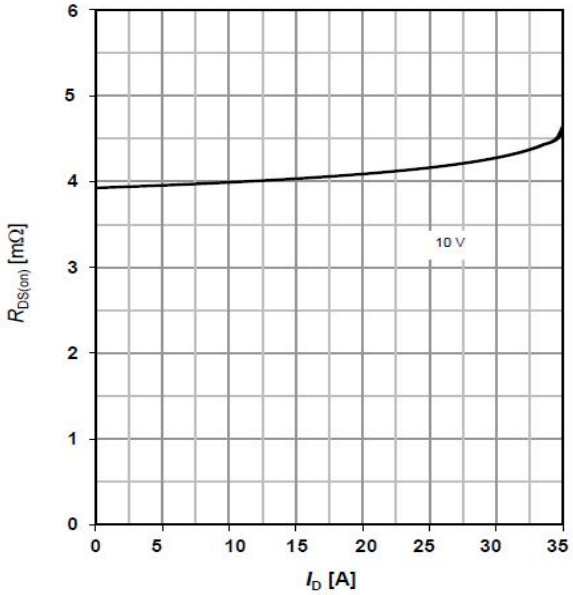
ID -- VDS



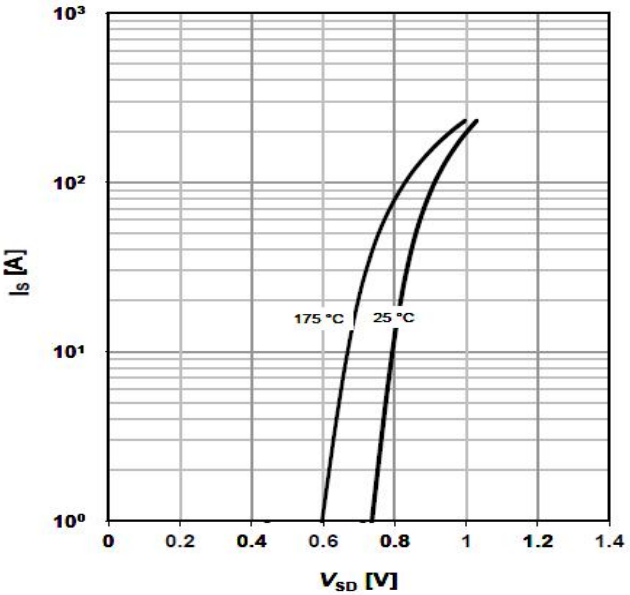
ID -- VGS



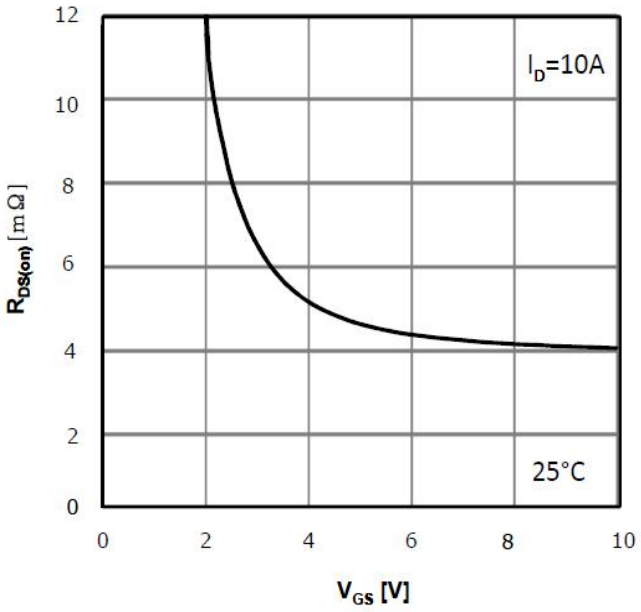
RDS(on) -- ID



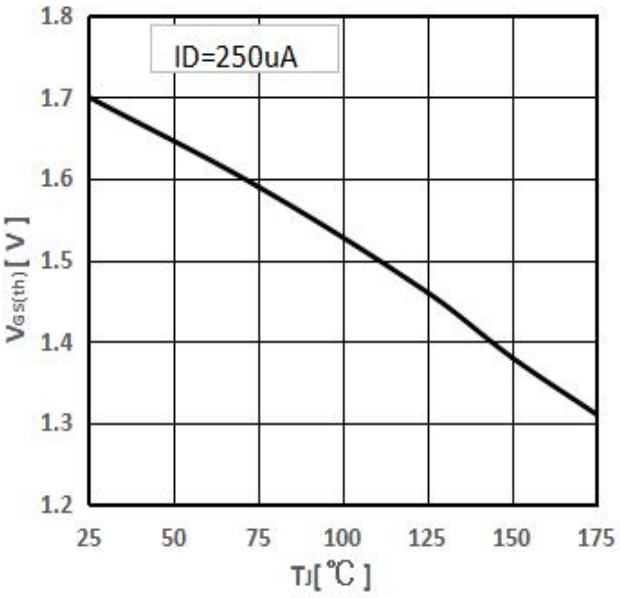
Is -- VSD



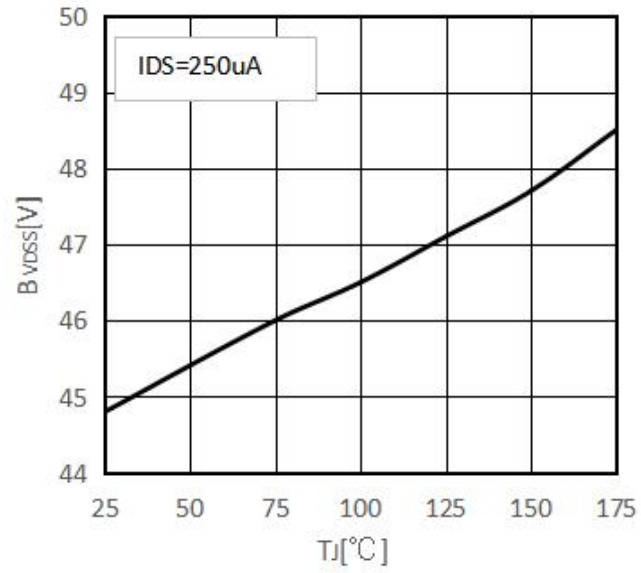
RDS(on) -- VGS



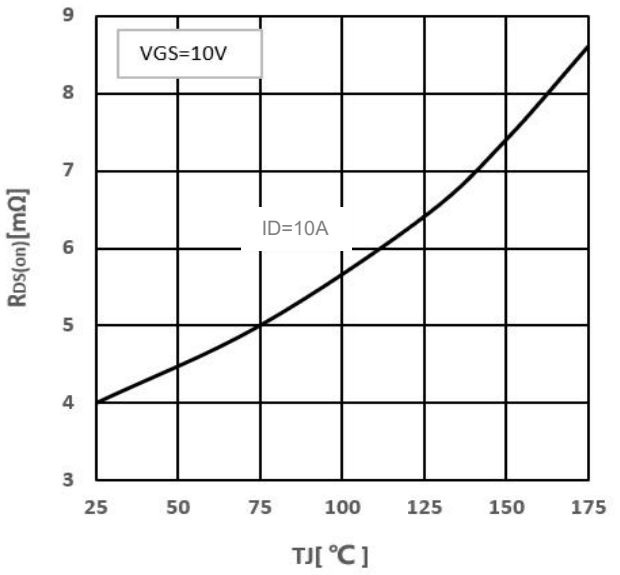
Threshold Voltage



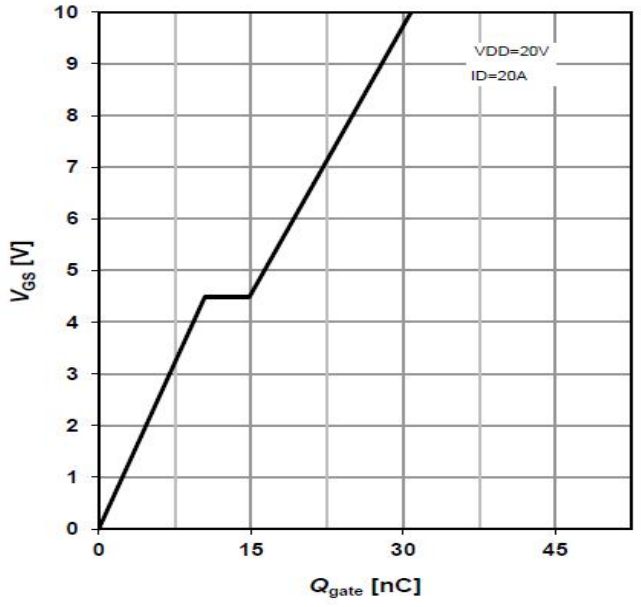
Drain-source breakdown voltage



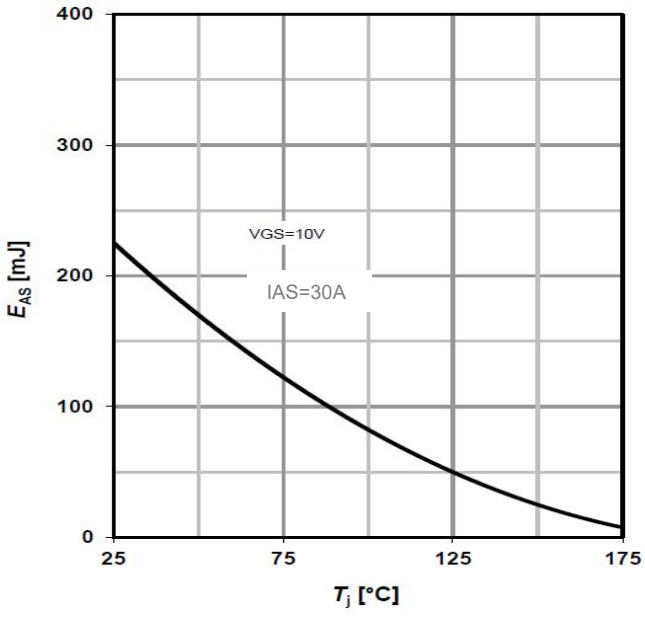
RDS（on） -- Tj



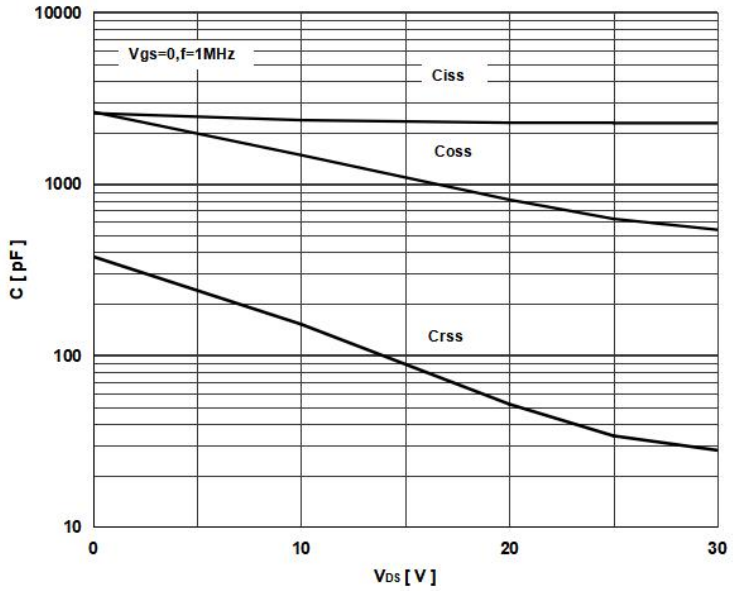
Typ.gate charge



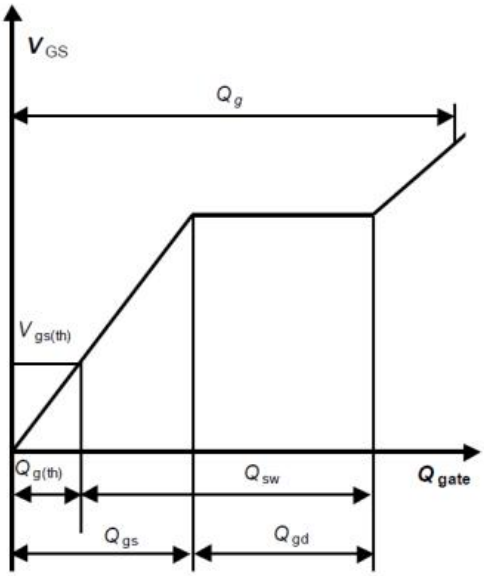
Avalanche energy



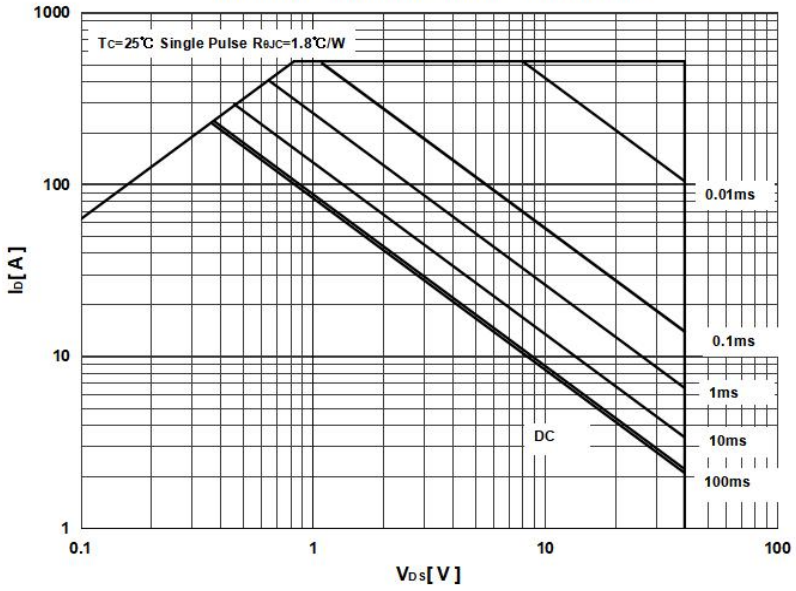
Typ.capacitance



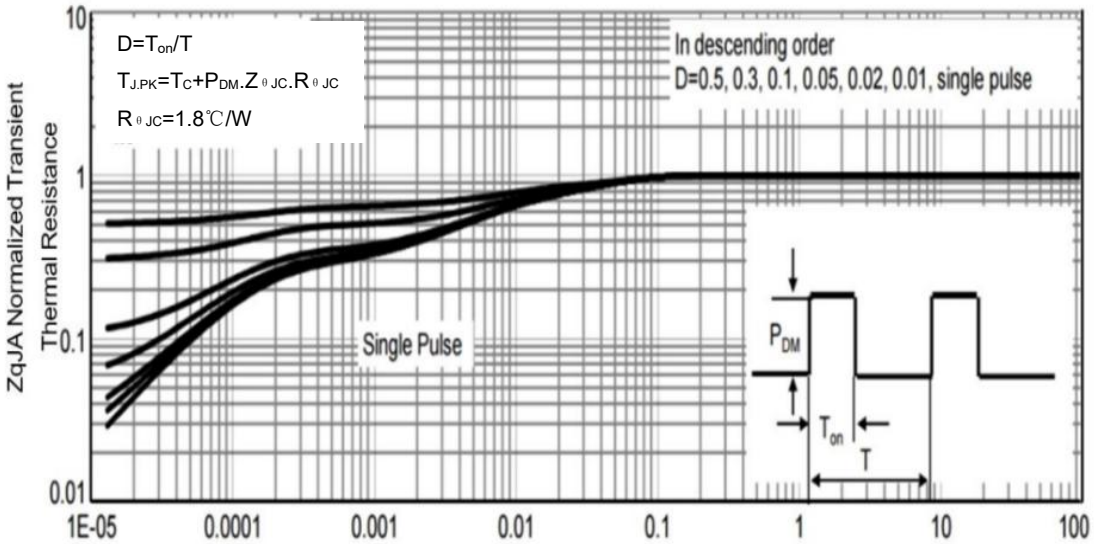
Gate charge waveforms



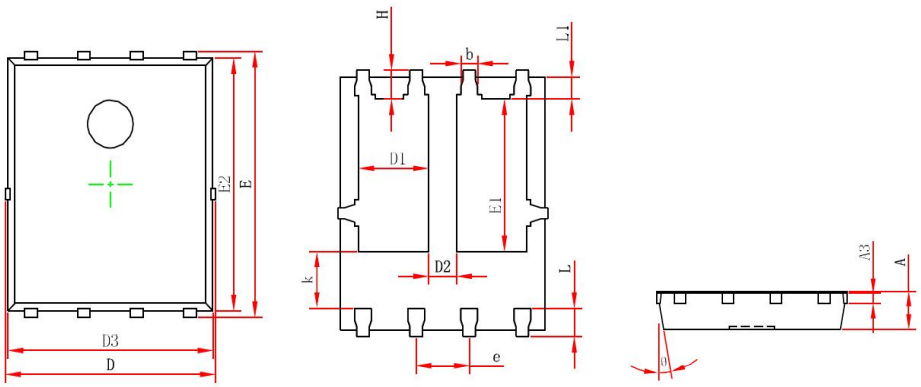
Maximum Forward Biased Safe Operating Area



Normalized Thermal Transient Impedance

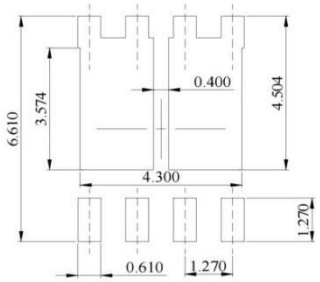


PDFN/PPAK5*6-8L Package Outline Dimensions



Symbol	Dimension in Millimeters		Dimension in Inches	
	Min	Max	Min	Max
A	0.950	1.150	0.037	0.045
A3	0.200	0.300	0.008	0.012
D	4.950	5.350	0.195	0.211
E	5.950	6.350	0.234	0.250
D1	1.470	1.870	0.058	0.074
E1	3.380	3.730	0.133	0.147
D2	0.450	0.900	0.018	0.035
D3	4.900	5.300	0.193	0.209
E2	5.700	5.900	0.224	0.232
k	1.180	1.480	0.046	0.058
b	0.350	0.450	0.014	0.018
e	1.220	1.320	0.048	0.052
L	0.500	0.700	0.020	0.028
L1	0.325	0.575	0.013	0.023
H	0.500	0.700	0.020	0.028
θ	10°	12°	10°	12°

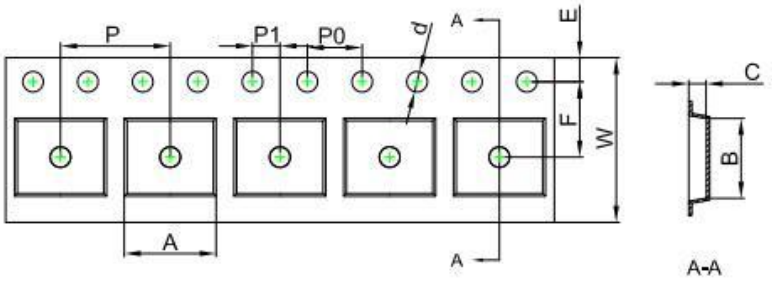
PDFN/PPAK5*6-8L Suggested Pad Layout



Note:
1. Controlling dimension：in millimeters.
2. General tolerance:0.5mm.
3. The pad layout is for reference purposes only.

PDFN/PPAK5*6-8L Tape and Reel

PDFN/PPAK5*6-8L Embossed Carrier Tape

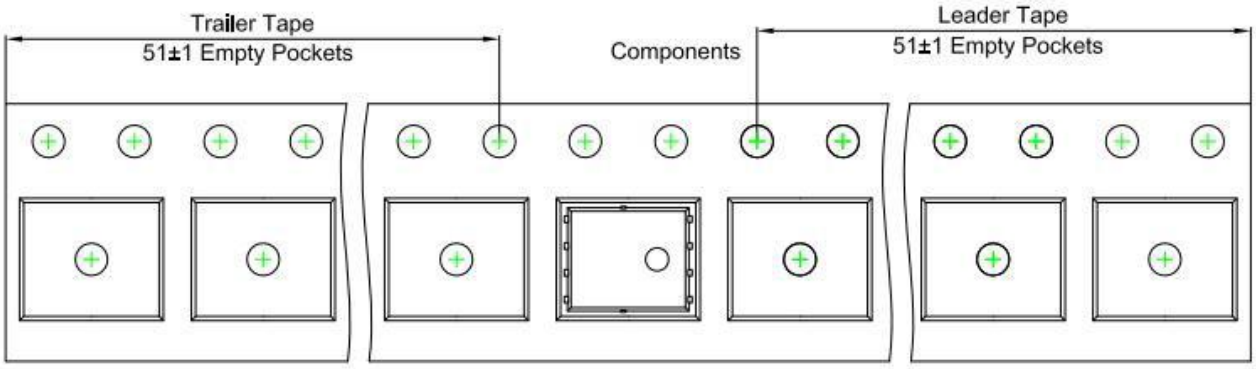


Packaging Description:

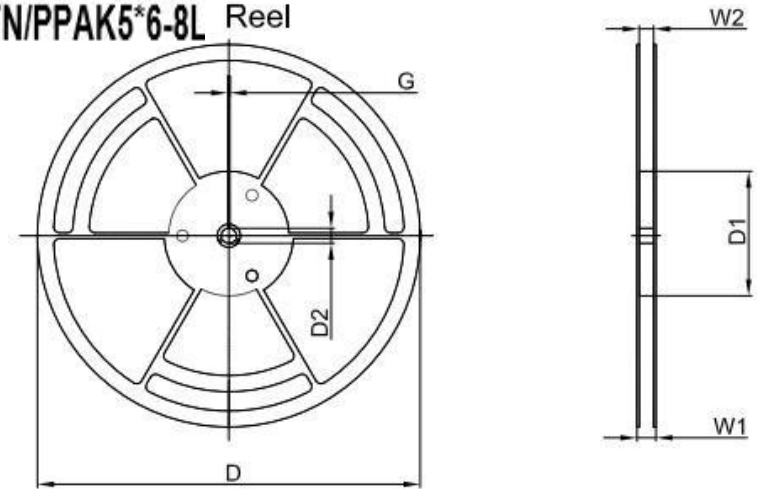
PDFN/PPAK5*6-8L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 5,000 units per 13" or 33.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
PDFN/PPAK5*6-8L	6.30	5.30	1.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

PDFN/PPAK5*6-8L Tape Leader and Trailer



PDFN/PPAK5*6-8L Reel



Dimensions are in millimeter						
Reel Option	D	D1	D2	G	W1	W2
13"Dia	Ø330.00	100.00	13.00	1.90	17.60	12.40

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)
5,000 pcs	13 inch	5,000 pcs	340×336×29	50,000 pcs	353×346×365

Date of change	Rev #	revise content
2022/11/28	A/0	/
2023/10/31	A/1	完善产品尺寸表格