

N-channel Power MOSFET:
30V, 3.9mohm, 48A

Product Summary

VDSS	VGSS	RDS(ON) TYP/MAX	ID MAX
30V	± 20V	3.7/5.2 mΩ@VGS=10V 6.1/9.3 mΩ@VGS=4.5V	50A

Marking Symbol Code

- ❖ Laser Marking Device Code: AP



GS : Gostone (fixed)
AP : Marking Device Code (fixed)
M : Factory Code (fixed)
Y : Year Code
W : Week Code
L : LOT Code
● : Pin#1 Identifier

Form

- ❖ Tape & Reel Embossed Type: 5,000pcs / reel

Absolute Maximum Rating Ta=25°C

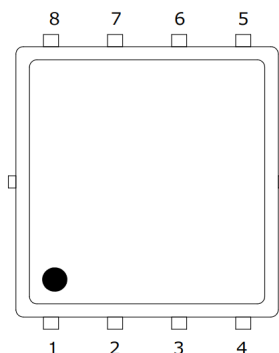
Parameter	Symbol	Rating	Unit
Drain to Source Voltage	VDS	30	V
Gate to Source Voltage	VGS	±20	V
Continuous Drain Current	IDM	50	A
		31	A
Pulsed Drain Current*1	IDM	99	A
Continuous Drain Current	IDSM	14.5	A
		11.4	A
Avalanche Current	IAS	18.5	A
Avalanche Energy	EAS	16.8	mJ
Power Dissipation	PD	25	W
		10	W
Power Dissipation*3	PDSM	5	W
		3	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 to +150	°C

*1Pulse width limited by maximum junction temperature.

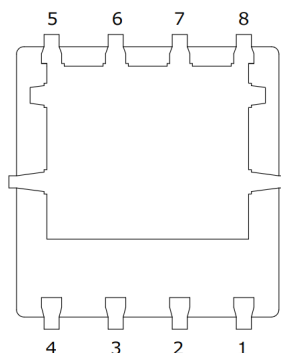
*2The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.

*3The Power dissipation is based on R_{θJA} t ≤ 10s value.

Top View



Bottom View



1,2,3: Source
4: Gate
5,6,7,8: Drain

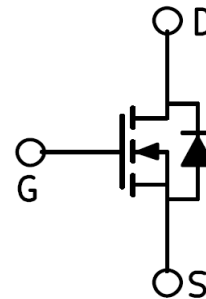
Features

- ❖ Low RDSon
- ❖ Low Gate Charge
- ❖ High Current Capacity
- ❖ Halogen-Free / RoHS Compliant

Application

- ❖ Battery Charging & Discharging for NB Battery Pack
- ❖ DC/DC Converters in Computing.

Equivalent circuit



Thermal Characteristics (Typical)

Parameter	Symbol	Rating	Unit
Junction-to Ambient (T _A =25°C)			
t ≤ 10s	R _{thJA} ⁻²	19.5	°C/W
Steady-State		51.0	°C/W
Junction-to Case (T _C =25°C)			
Steady-State	R _{thJC}	3.9	°C/W



Electrical Characteristics (Tj=25degC)

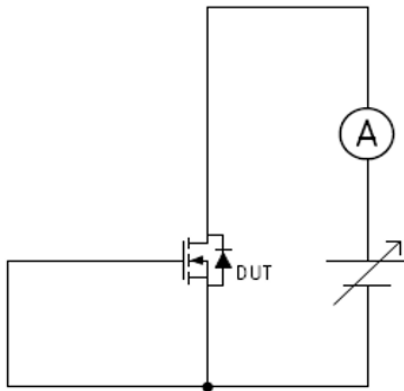
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VDSS	ID=250μA, VGS=0V	30			V
Zero Gate Voltage Drain Current	IDSS	VDS=24V, VGS=0V			1	μA
Gate-Source Leakage Current	IGSS	VGS=±20V, VDS=0V			±100	nA
Gate-Source Threshold Voltage	Vth	VDS=VGS, ID=250μA	1.2	1.7	2.4	V
Drain-Source On-State Resistance	RDS(on)1	ID=13A, VGS=10V		3.7	5.2	mΩ
	RDS(on)2	ID=13A, VGS=4.5V		6.1	9.3	
Forward Transconductance	gFS	VGS=5V, ID=13A		78		S
Input Capacitance ^{*1}	Ciss	VDS=15V, VGS=0V, f=1MHz		810		pF
Output Capacitance ^{*1}	Coss			604		
Reverse Transfer Capacitance ^{*1}	Crss			38		
Gate Resistance ^{*1}	Rg	f=1MHz		2.3		Ω
Turn-On Delay Time ^{*1 *2}	td(on)	VDD=15V, VGS=10V, ID=13A		7.2		ns
Rise Time ^{*1 *2}	tr			5.1		
Turn-Off Delay Time ^{*1 *2}	td(off)	VDD=15V, VGS=10V, ID=13A		24.6		ns
Fall Time ^{*1 *2}	tf			10.5		
Total Gate Charge ^{*1}	Qg	VDD=15V, VGS=10V, ID=13A		15.6		nC
Gate-Source Charge ^{*1}	Qgs			2.5		
Gate-Drain Charge ^{*1}	Qgd			3.8		
Diode Forward Voltage	VSD	IS=13A, VGS=0V			1.2	V
Maximum Body Diode Continuous Current	IS				26	A
Body Diode Reverse Recovery Time ^{*1}	trr	IF=13A, di/dt=100A/μs		23.0		ns
Body Diode Reverse Recovery Charge ^{*1}	Qrr			10.0		nC

Note *1 Guaranteed by Design

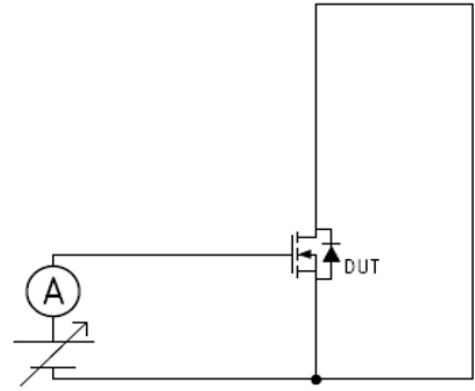
Note *2 Measurement Circuit for Switching Characteristics

Test circuits

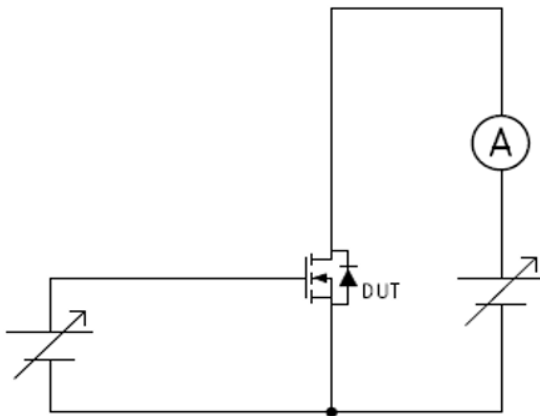
Test Circuit 1
VDSS/IDSS



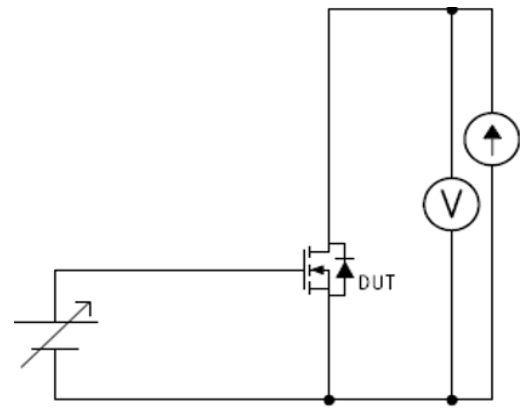
Test Circuit 2
IGSS



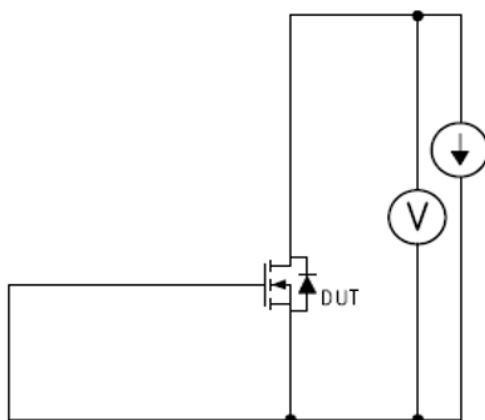
Test Circuit 3
Vth



Test Circuit 4
RDS(on)

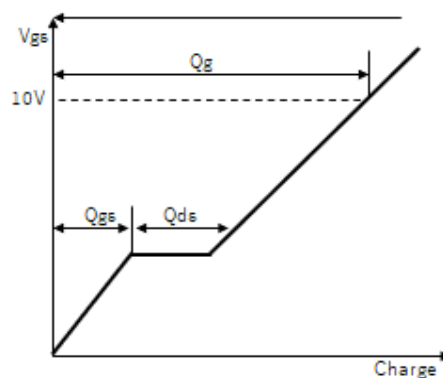
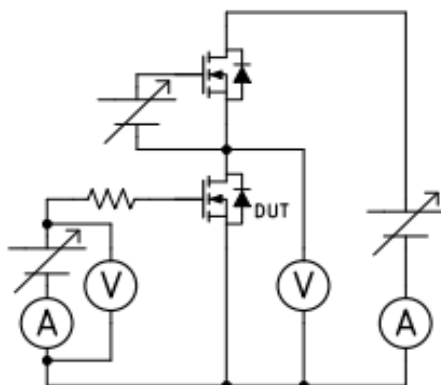


Test Circuit 5
VF

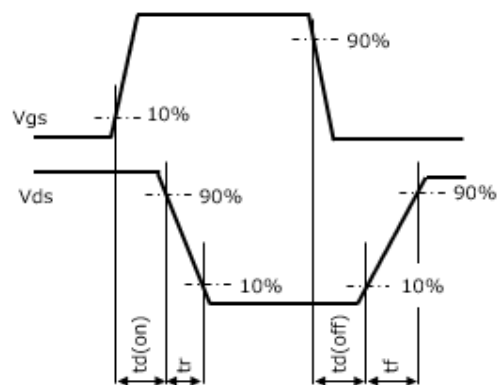
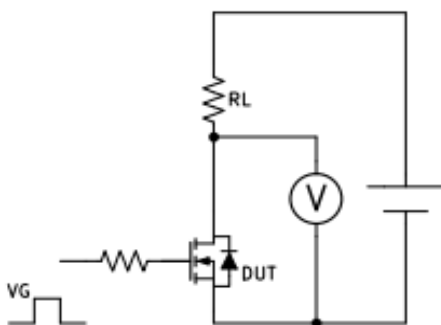


Test circuits

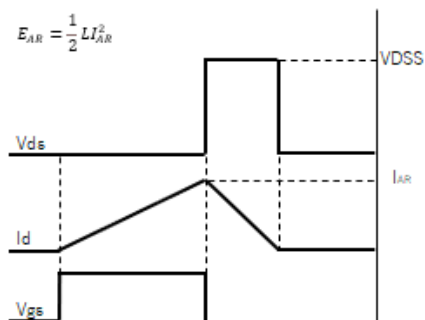
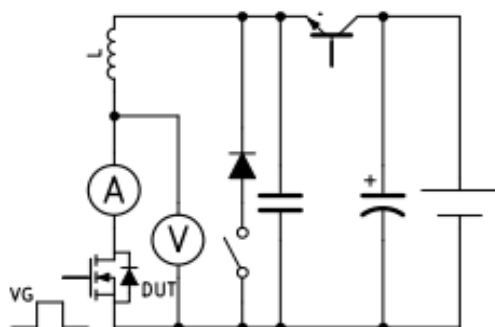
Test Circuit 6
Q_g



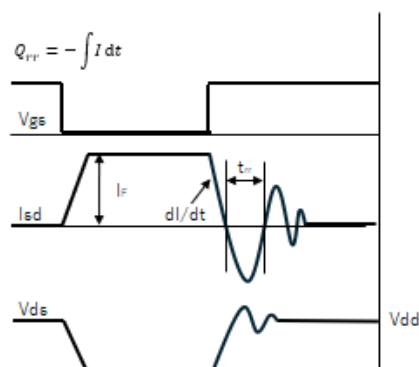
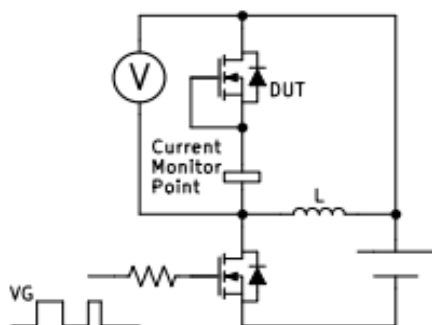
Test Circuit 7
Switching Time

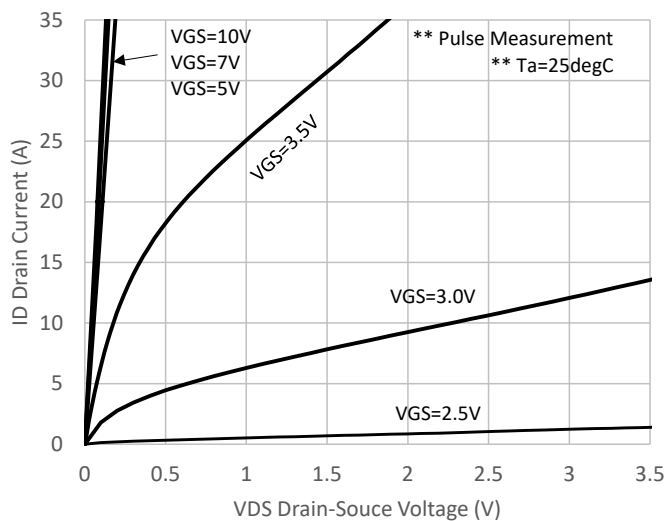
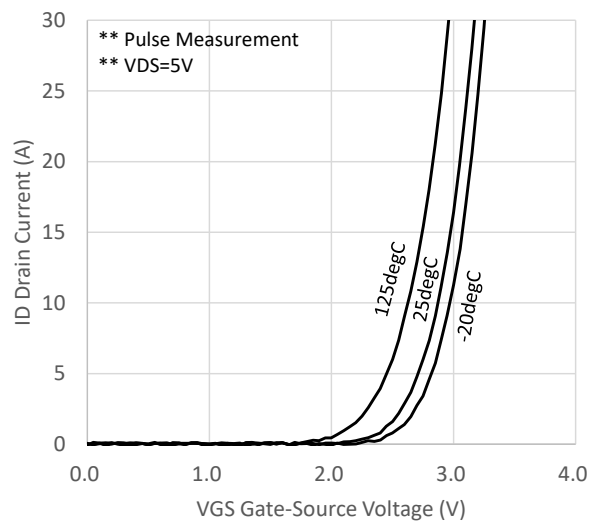
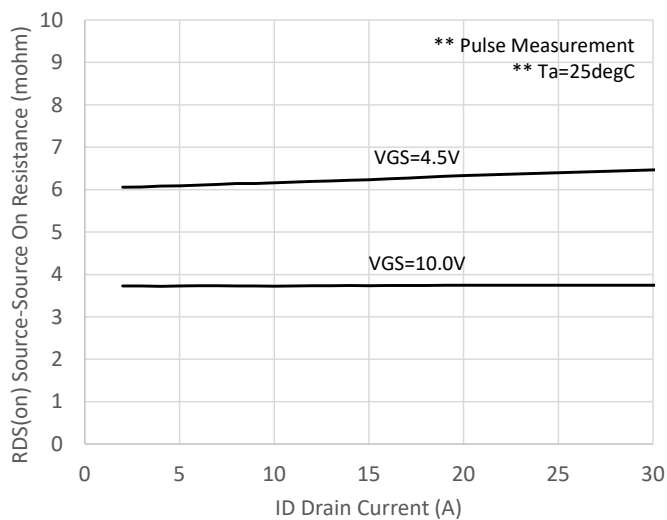
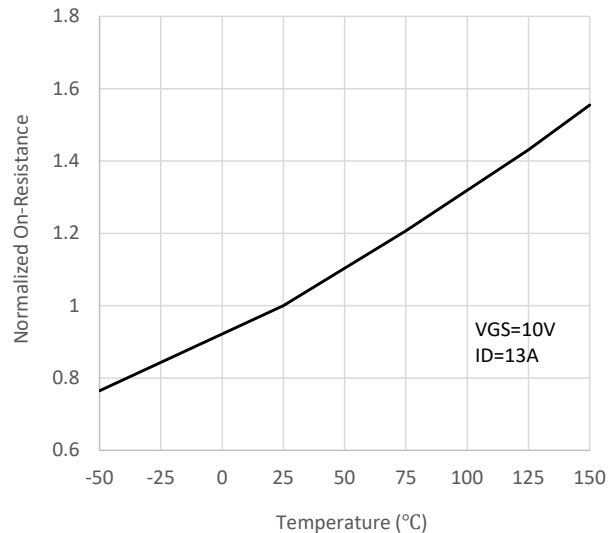
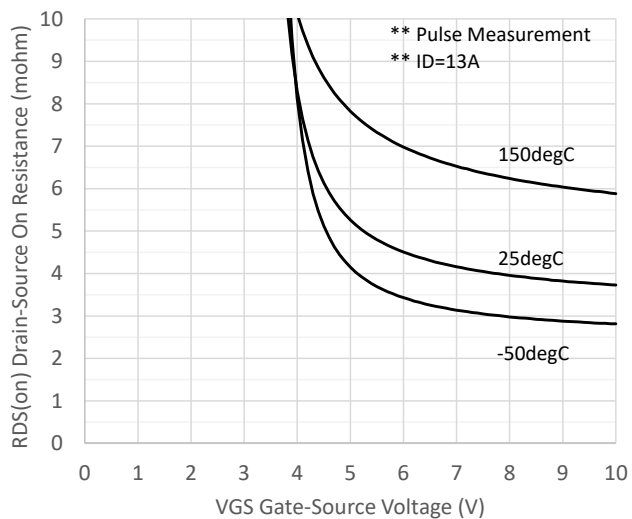
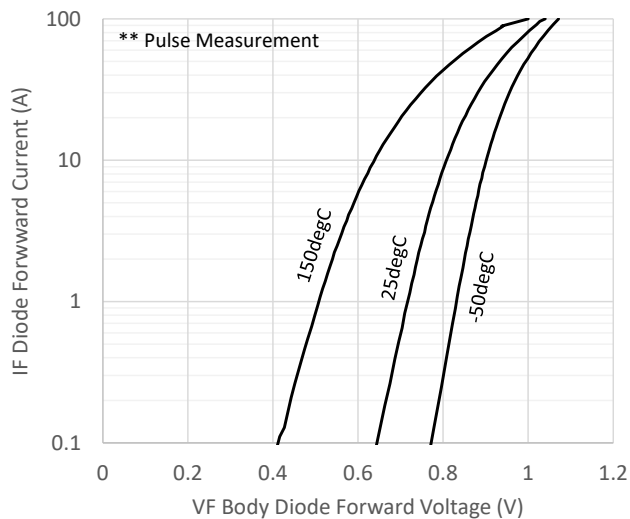


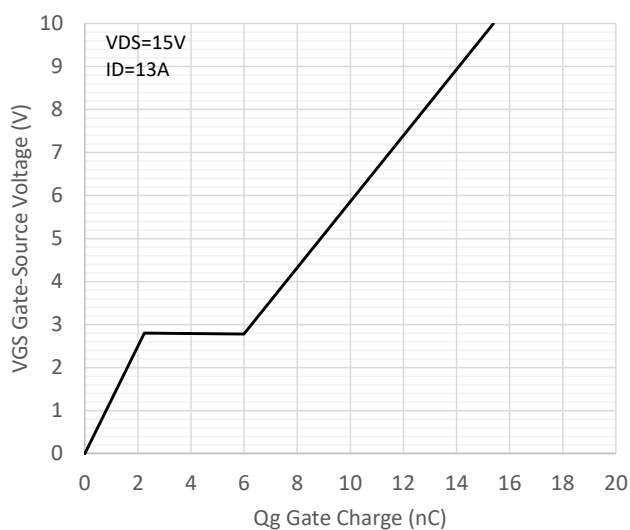
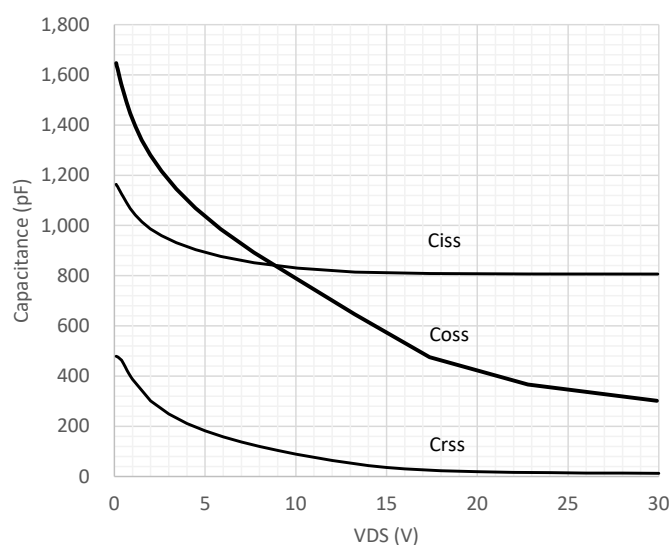
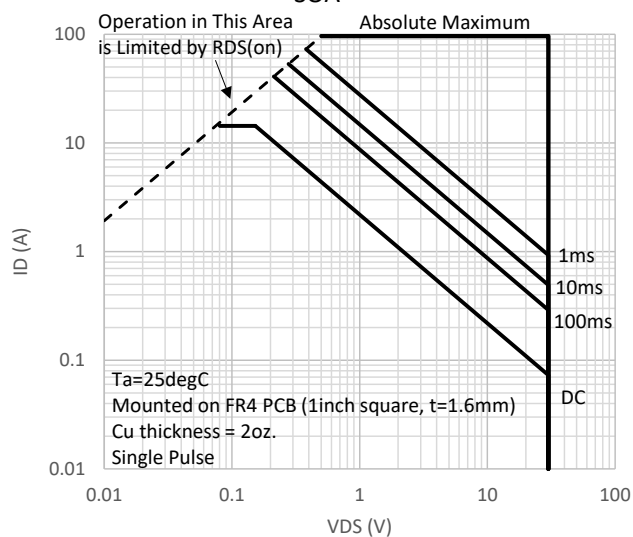
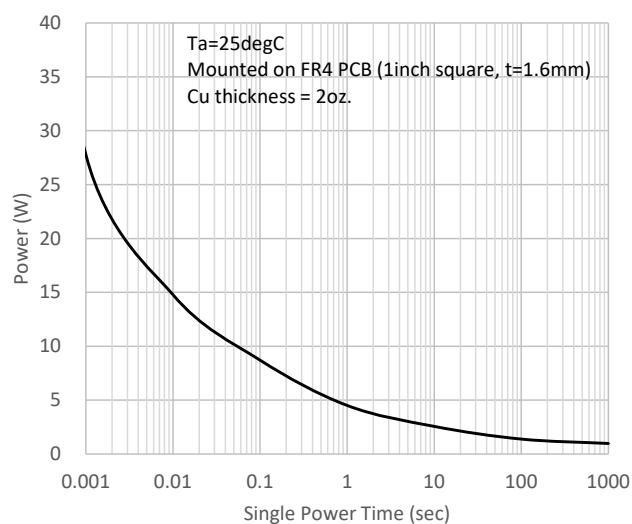
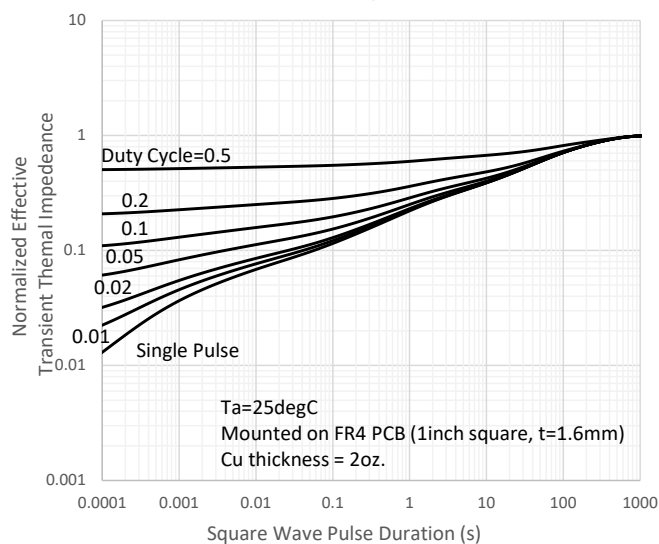
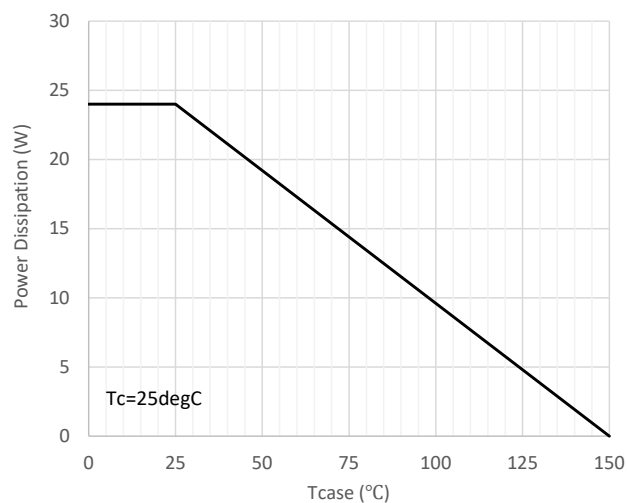
Test Circuit 8
IAS

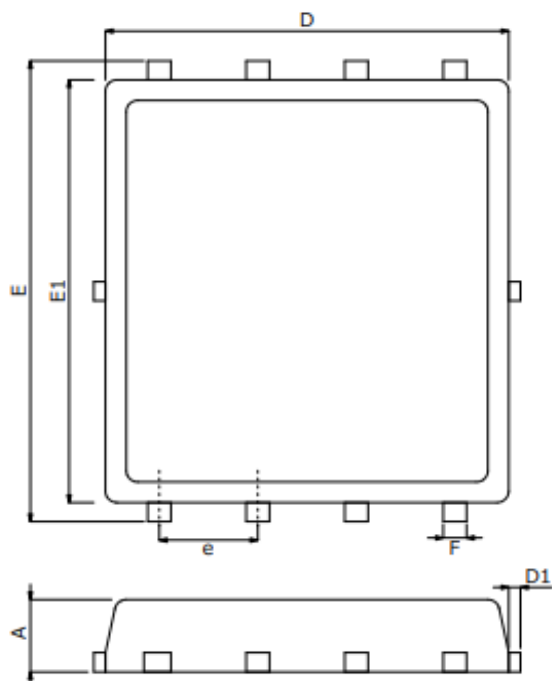
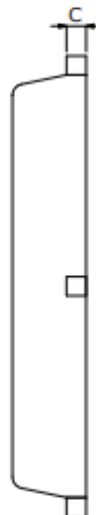
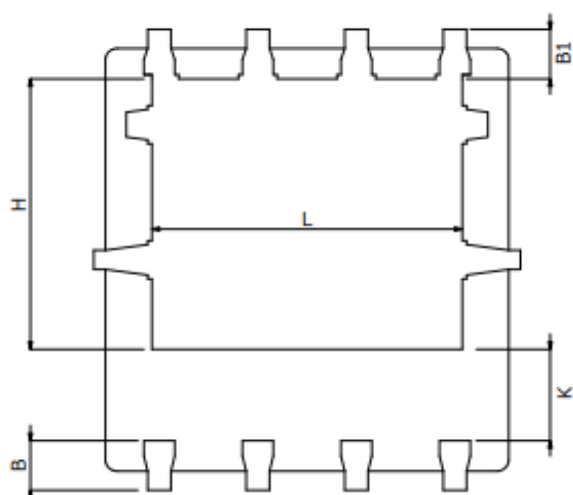


Test Circuit 9
trr/Qrr



Technical data
ID to VDS

ID to VGS

RDS(on) to ID

On-Resistance vs Junction Temperature

RDS(on) to VGS

IF to VF


Technical data
Gate-Charge Characteristics

Capacitance Characteristic

SOA

Single Pulse Maximum Power Dissipation

Thermal Response

Power Derating


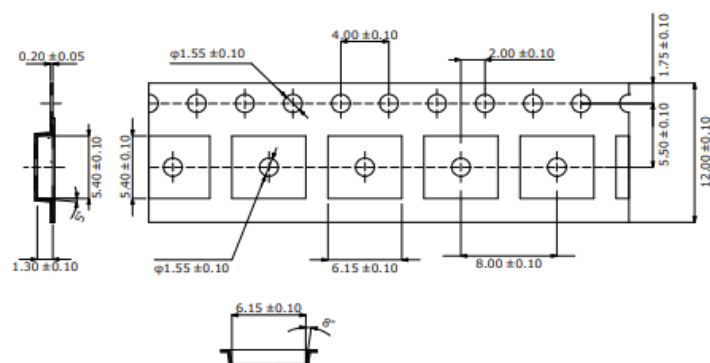
Package Outline Dimensions
Top View

Side View

Bottom View


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.900	0.950	1.000
B	0.480	0.580	0.680
B1	0.550	0.650	0.750
C	0.200	0.254	0.300
D	5.100	5.200	5.300
D1	-	-	0.150
E	5.900	6.050	6.200
E1	5.400	5.550	5.700
e	1.220	1.270	1.320
F	0.250	0.300	0.350
H	3.270	3.470	3.670
L	3.800	4.000	4.200
K	1.200	-	-

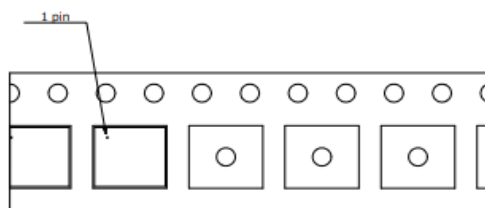
Form

- ❖ Tape & Reel Embossed Type: 5,000pcs / reel
- ❖ Factory PKG Code: PDFN
- ❖ Tape Width: 12mm, Pitch: 8mm, Reel Size: 12inch

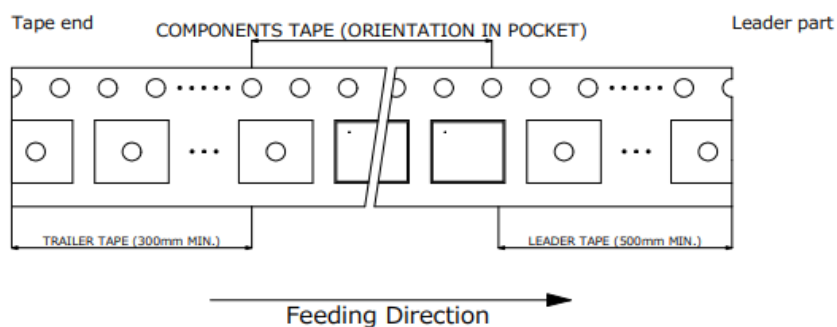
Tape size (mm)



Pin1 Direction



Tape end ~ Leader part (mm)



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