

N-channel Power MOSFET:
30V, 4.0mohm, 46A, PDFN3333

Product Summary

VDS	VGSS	RDS(ON) TYP/MAX	ID MAX
30V	± 20V	4.0/5.6 mΩ@VGS=10V 6.5/11 mΩ@VGS=4.5V	46A

Marking Symbol Code

- ❖ Laser Marking Device Code: APR



GS : Gostone (fixed)
APR: Marking Device Code (fixed)
A: Factory Code
Y: Year Code
WW: Week Code
LT: LOT Code
o : Pin#1 Identifier

Form

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

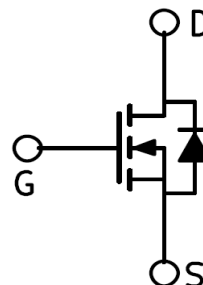
Features

- ❖ 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



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	46	A
		28	A
Pulsed Drain Current*1	IDM	90	A
Continuous Drain Current	IDSM	13.4	A
		10.4	A
Avalanche Current	IAS	18	A
Avalanche Energy	EAS	16.2	mJ
Power Dissipation	PD	22.4	W
		8.9	W
Power Dissipation*3	PDSM	4.2	W
		2.7	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 to +150	°C

*1Pulse width limited by maximum junction temperature.

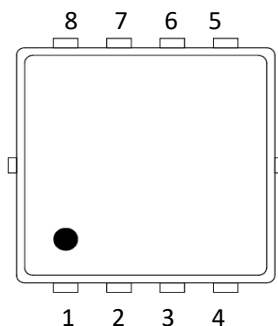
*2The value of RθJA is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with TA=25°C.

*3The Power dissipation is based on RθJA t ≤ 10s value.

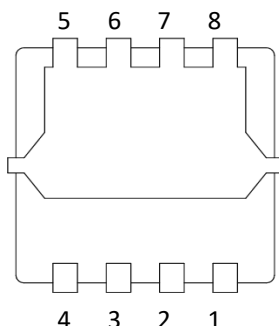
Thermal Characteristics (Typical)

Parameter	Symbol	TYP	Unit
Junction-to Ambient (T _A =25°C)			
t ≤ 10s	R _{thJA} ^{*2}	24.0	°C/W
Steady-State		57.0	°C/W
Junction-to Case (T _C =25°C)			
Steady-State	R _{thJC}	4.3	°C/W

Top View



Bottom View



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

Electrical Characteristics (Tj=25degC)

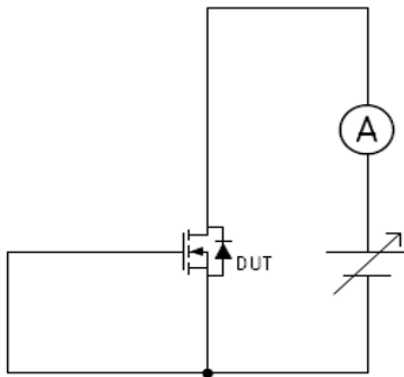
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VDSS	ID=250μA, VGS=0V	30			V
Zero Gate Voltage Drain Current	IDSS	VDS=24V, VGS=0V			1	μA
Gate-Source Leakage Current	IGSS	VGS=±20V, VDS=0V			±100	nA
Gate-Source Threshold Voltage	Vth	VDS=VGS, ID=250μA	1.2	1.7	2.4	V
Drain-Source On-State Resistance	RDS(on)1	ID=13A, VGS=10V		4.0	5.6	mΩ
	RDS(on)2	ID=13A, VGS=4.5V		6.5	11.0	
Forward Transconductance	gFS	VGS=5V, ID=13A		78		S
Input Capacitance *1	Ciss	VDS=15V, VGS=0V, f=1MHz		798		pF
Output Capacitance *1	Coss			595		
Reverse Transfer Capacitance *1	Crss			38		
Gate Resistance *1	Rg	f=1MHz		5.4		Ω
Turn-On Delay Time *1 *2	td(on)	VDD=15V, VGS=10V, ID=13A		7		ns
Rise Time *1 *2	tr			5		
Turn-Off Delay Time *1 *2	td(off)	VDD=15V, VGS=10V, ID=13A		24		ns
Fall Time *1 *2	tf			10		
Total Gate Charge *1	Qg	VDD=15V, VGS=10V, ID=13A		15.8		nC
Gate-Source Charge *1	Qgs			2.7		
Gate-Drain Charge *1	Qgd			3.9		
Diode Forward Voltage	VSD	IS=13A, VGS=0V			1.2	V
Maximum Body Diode Continuous Current	IS				18.6	A
Body Diode Reverse Recovery Time *1	trr	IF=13A, di/dt=100A/μs		23.2		ns
Body Diode Reverse Recovery Charge *1	Qrr			10.1		nC

Note *1 Guaranteed by Design

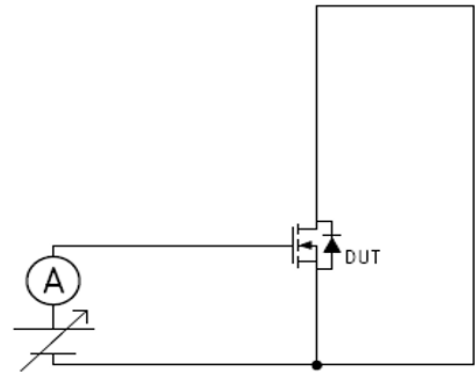
Note *2 Measurement Circuit for Switching Characteristics

Test circuits

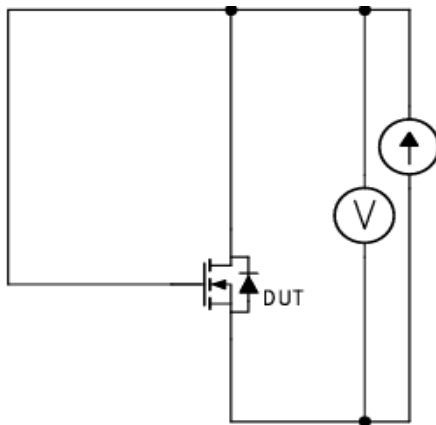
Test Circuit 1
VDSS/IDSS



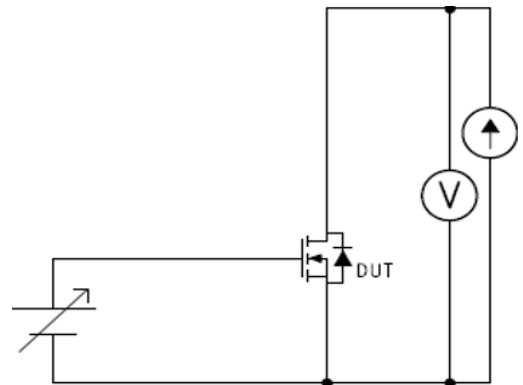
Test Circuit 2
IGSS



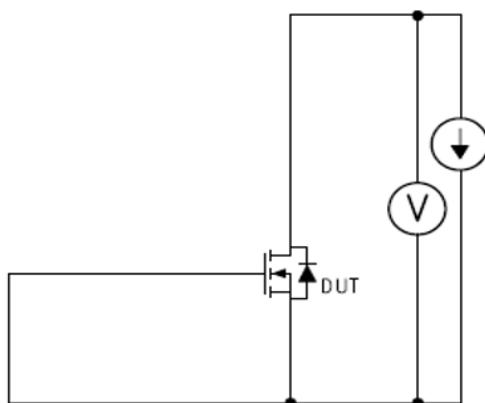
Test Circuit 3
Vth

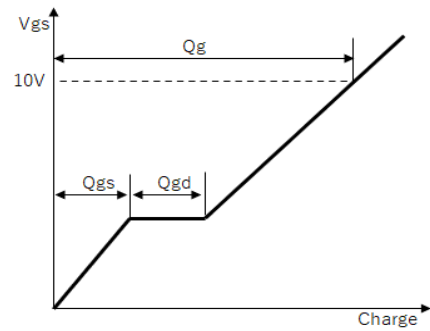
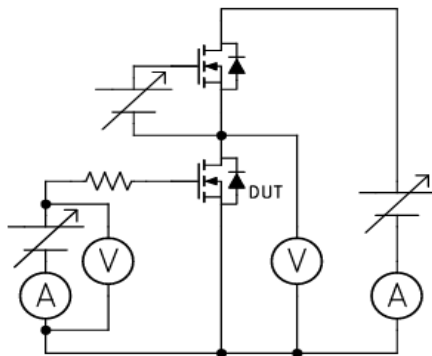
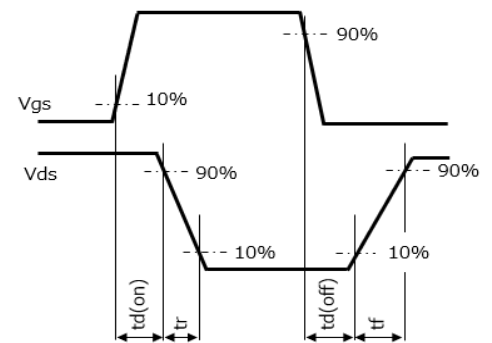
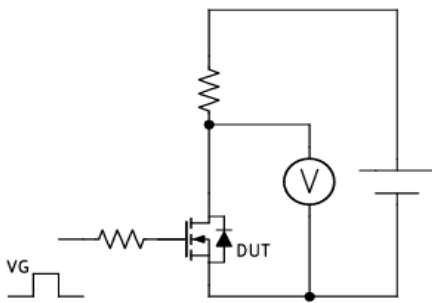
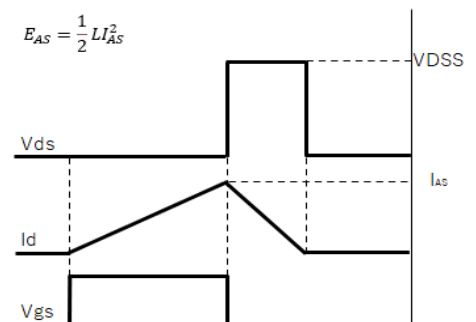
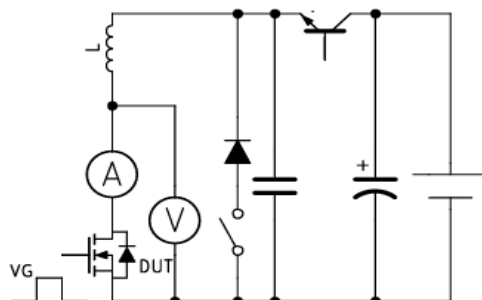
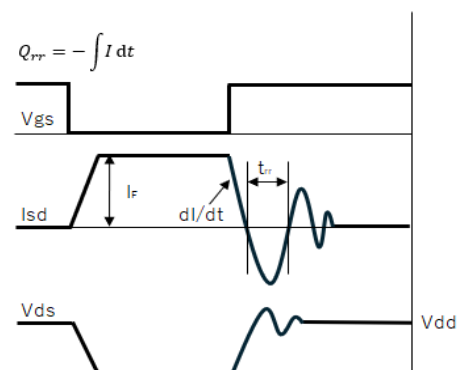
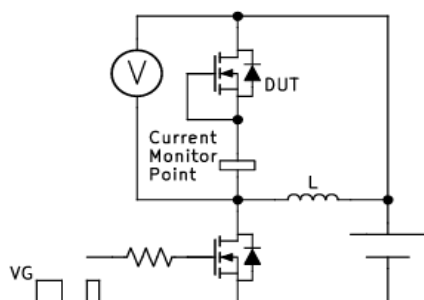


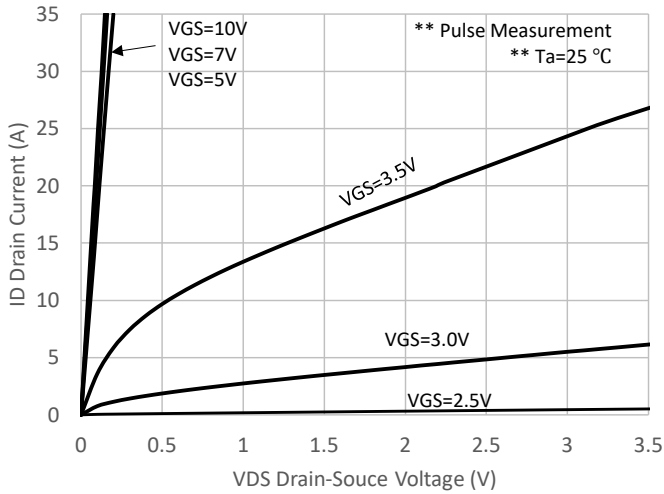
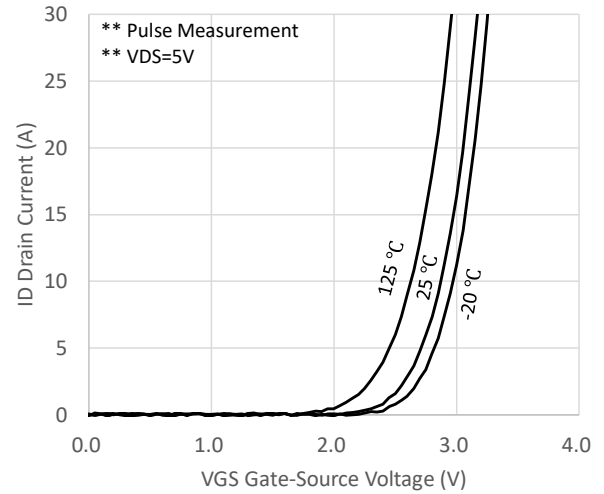
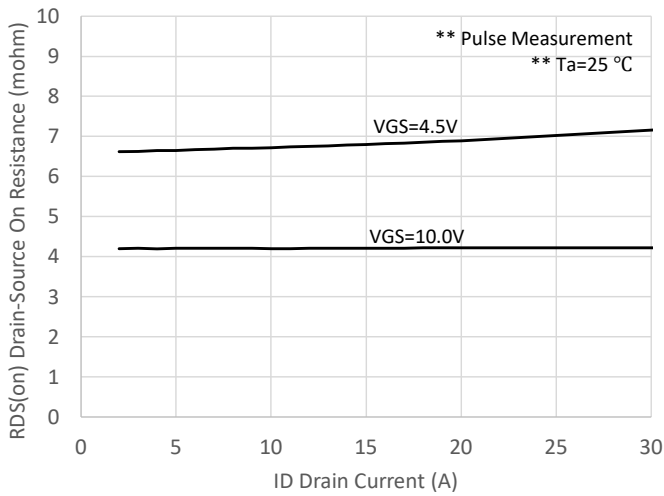
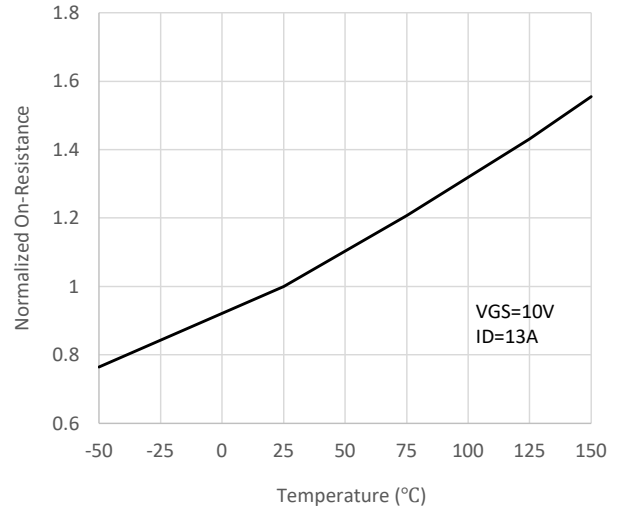
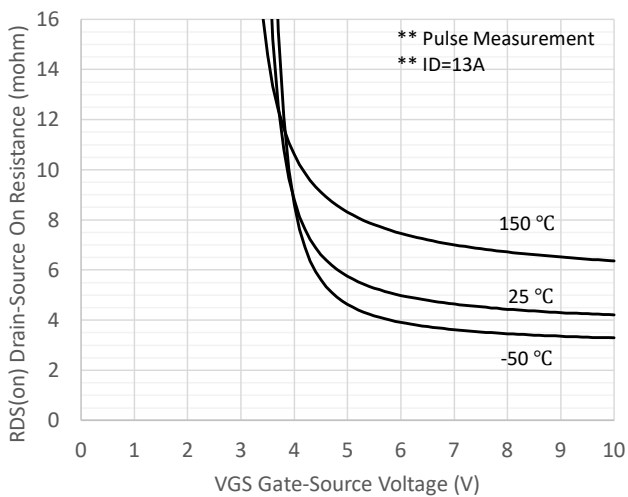
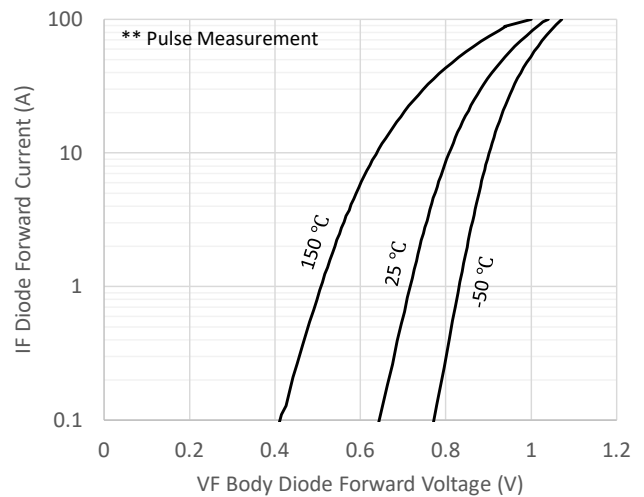
Test Circuit 4
RDS(on)

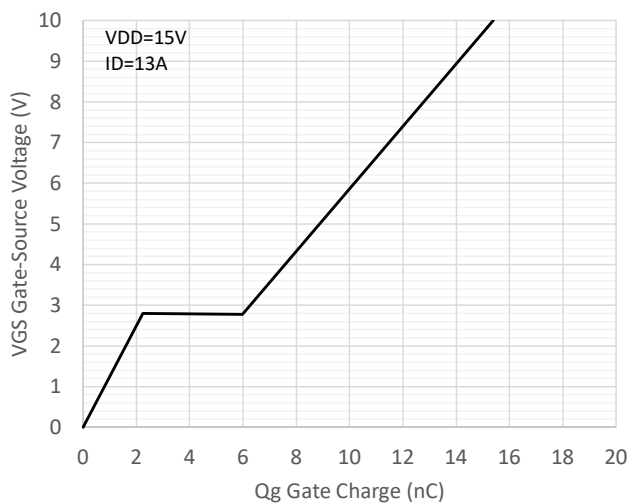
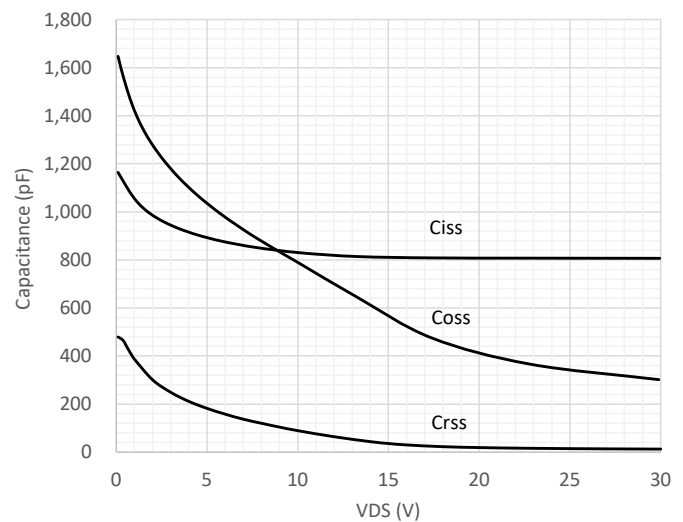
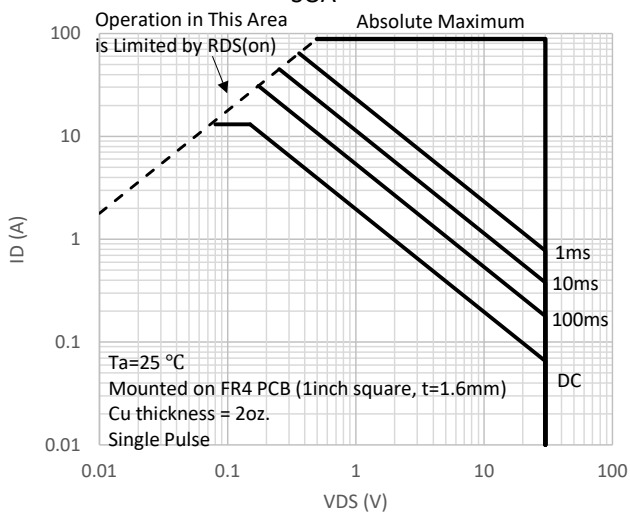
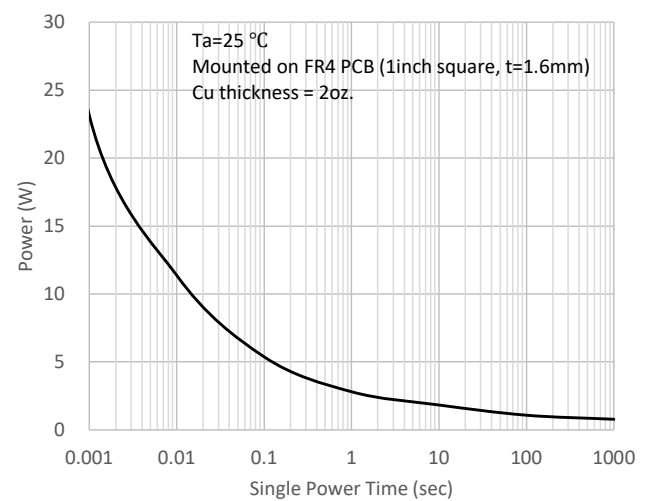
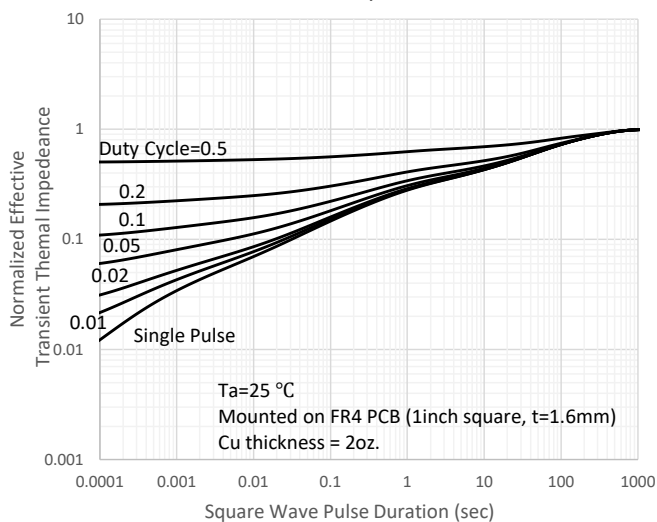
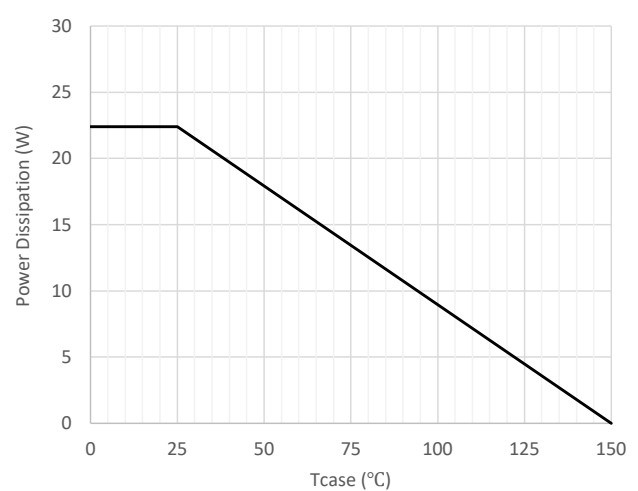


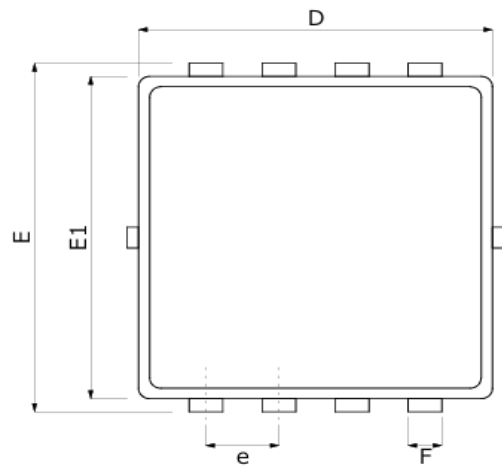
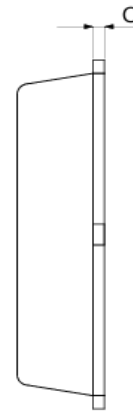
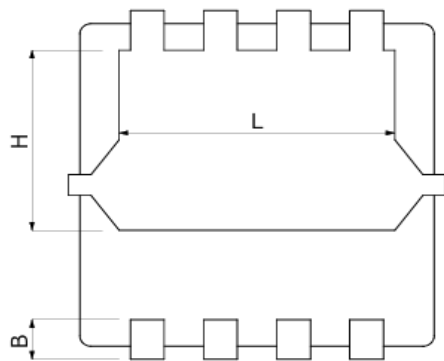
Test Circuit 5
VF



Test circuits
Test Circuit 6
Qg

Test Circuit 7
Switching Tin

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


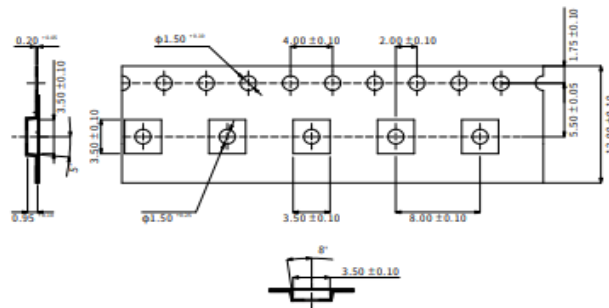
Package Outline Dimensions
Top View

Side View

Bottom View


Symbol	Min	Typ	Max
A	0.725	0.775	0.825
B	0.28	0.38	0.48
C	0.13	0.15	0.20
D	3.05	3.15	3.25
D1			0.10
E	3.25	3.35	3.45
E1	3.0	3.1	3.2
e	0.60	0.65	0.70
F	0.25	0.30	0.35
H	1.48	1.58	1.68
L	2.35	2.45	2.55

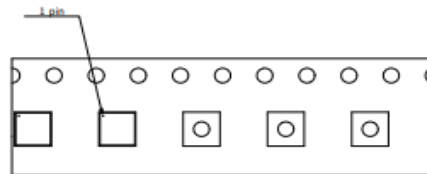
Form

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

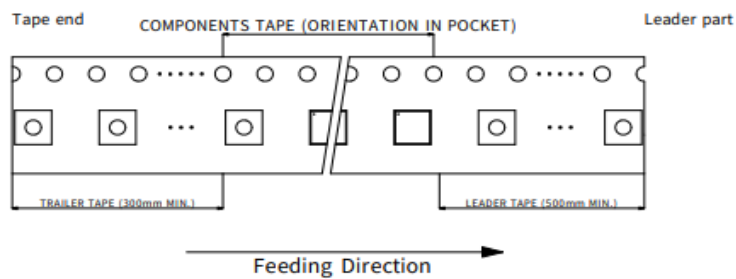
Tape size (mm)



Pin1 Direction



Tape end ~ Leader part (mm)



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