GOSTONE

N-channel Power MOSFET:
32V, 2.2mohm, 70A, DFN3333

GTN3209E1

Product Summary			
VDSS	VGSS	RDS(ON) TYP/MAX	ID MAX
32V	± 20V	2.2/2.9 mΩ@VGS=10V 3.4/5.8 mΩ@VGS=4.5V	**70A**

Features

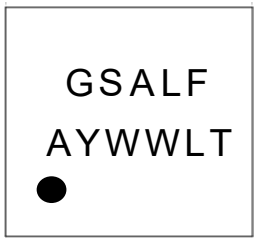
- Low RDSon
- Low Gate Charge
- High Current Capacity
- Halogen-Free / RoHS Compliant
- Package: DFN3333

Application

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

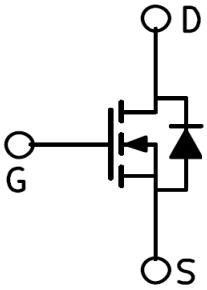
Marking Symbol Code

- Laser Marking Device Code: ALF



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

Equivalent circuit



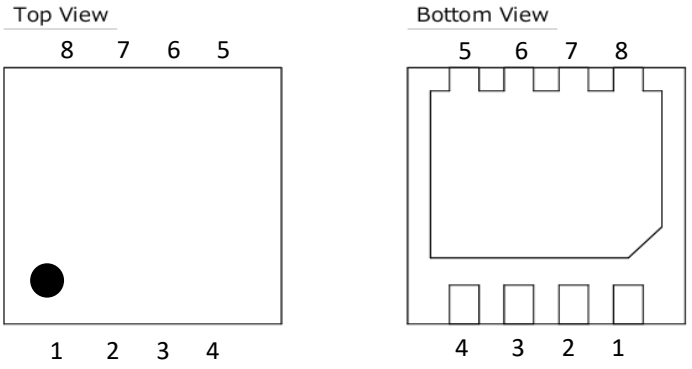
Form

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

Absolute Maximum Rating Ta=25℃				
Parameter		Symbol	Rating	Unit
Drain to Source Voltage		VDS	32	V
Gate to Source Voltage		VGS	±20	V
Continuous Drain Current	Tc=25°C	ID	70	A
	Tc=100°C		45	A
Pulsed Drain Current[*1]		ID,pulse	180	A
Continuous Drain Current	T_A=25°C	ID	18.6	A
	T_A=70°C		14.9	A
Avalanche Current		IAS	33	A
Avalanche Energy	L=0.1mH	EAS	54.5	mJ
Power Dissipation	Tc=25°C	PD	29	W
	Tc=100°C		12	W
Power Dissipation[*3]	T_A=25°C	PD	4.5	W
	T_A=70°C		2.9	W
Junction Temperature		Tj	150	℃
Storage Temperature		Tstg	-55 to +150	℃

Thermal Characteristics (Typical)				
Parameter		Symbol	TYP	Unit
Junction-to Ambient (T_A=25°C)				
	t ≤ 10s	R_{thJA}[*2]	22.4	℃/W
	Steady-State		54.4	℃/W
Junction-to Case (Tc=25°C)				
	Steady-State	R_{thJC}	3.27	℃/W

[*1]Pulse width limited by maximum junction temperature.
[*2]The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.
[*3]The Power dissipation is based on $R_{\theta JA}$ t ≤ 10s value.



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

Electrical Characteristics (Tj=25℃)

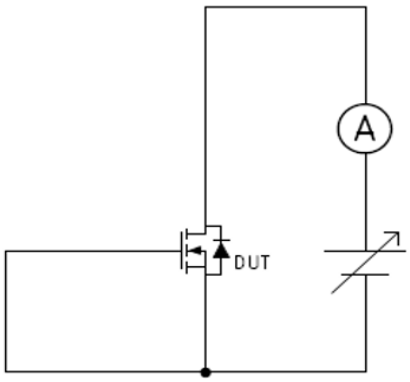
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VDSS	ID=250μA, VGS=0V	32			V
Zero Gate Voltage Drain Current	IDSS	VDS=32V, VGS=0V			1	μA
Gate-Source Leakage Current	IGSS	VGS=±20V, VDS=0V			±100	nA
Gate-Source Threshold Voltage	Vth	VDS=VGS, ID=250μA	1.2	1.6	2.4	V
Drain-Source On-State Resistance	RDS(on)1 RDS(on)2	ID=20A, VGS=10V ID=16A, VGS=4.5V		2.2 3.4	2.9 5.8	mΩ
Forward Transconductance	gFS	VGS=5V, ID=20A		84		S
Input Capacitance *1 Output Capacitance *1 Reverse Transfer Capacitance *1	Ciss Coss Crss	VDS=15V, VGS=0V, f=1MHz		1,984 1,335 62		pF
Gate Resistance *1	Rg	f=1MHz		10.5		Ω
Turn-On Delay Time *1 *2 Rise Time *1 *2	td(on) tr	VDD=15V, VGS=10V, ID=20A		8 5		ns
Turn-Off Delay Time *1 *2 Fall Time *1 *2	td(off) tf	VDD=15V, VGS=10V, ID=20A		72 45		ns
Total Gate Charge *1 Gate-Source Charge *1 Gate-Drain Charge *1	Qg Qgs Qgd	VDD=15V, VGS=10V, ID=20A		33.4 6.5 7.4		nC
Diode Forward Voltage	VSD	IS=20A, VGS=0V		0.8	1.0	V
Maximum Body Diode Continuous Current	IS				29	A
Body Diode Reverse Recovery Time *1 Body Diode Reverse Recovery Charge *1	trr Qrr	IF=20A, di/dt=100A/μs		44 40		ns nC

Note *1 Guaranteed by Design

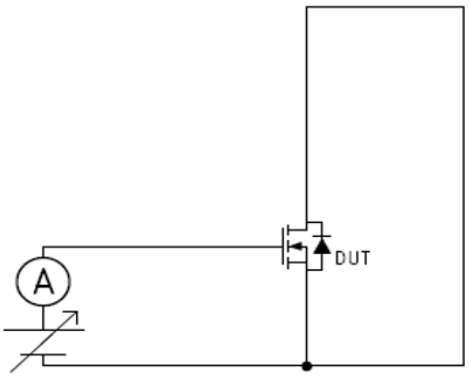
Note *2 Measurement Circuit for Switching Characteristics

Test circuits

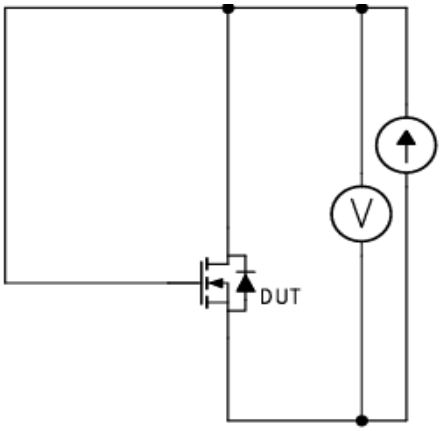
Test Circuit 1
VDSS/IDSS



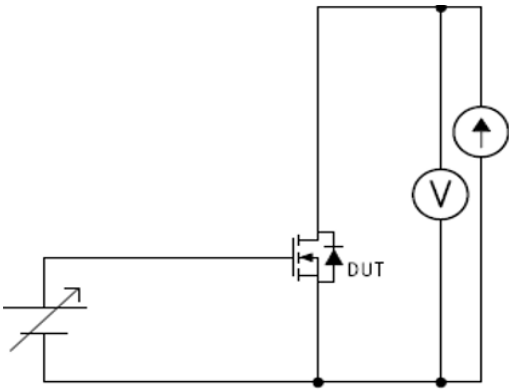
Test Circuit 2
IGSS



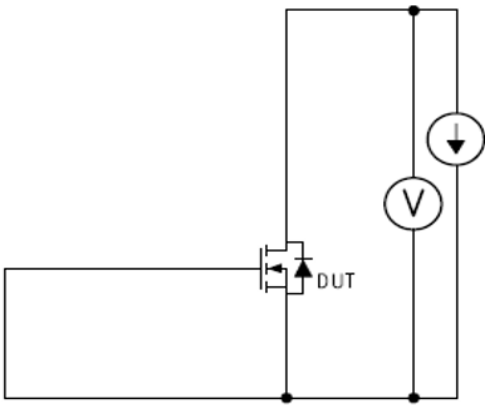
Test Circuit 3
Vth



Test Circuit 4
RDS(on)

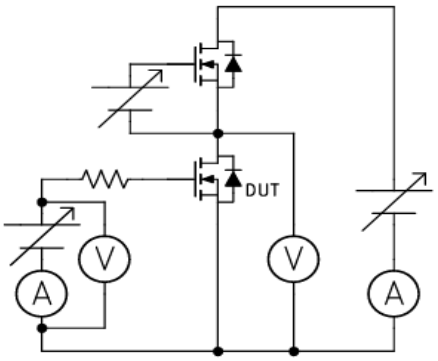


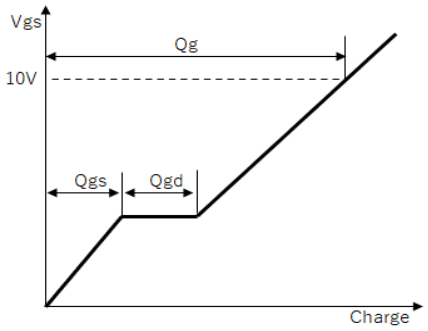
Test Circuit 5
VF



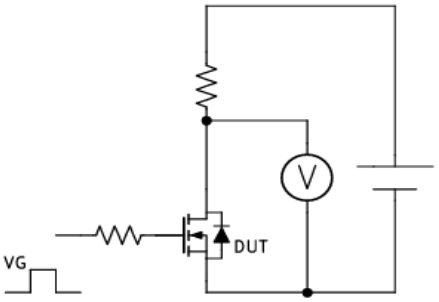
Test circuits

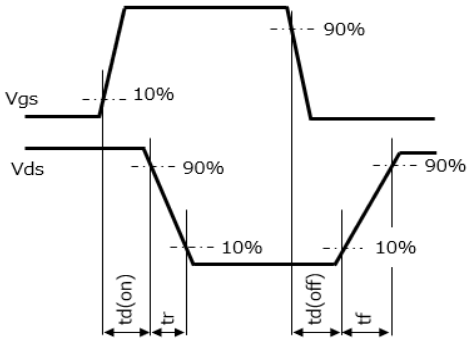
Test Circuit 6
Qg



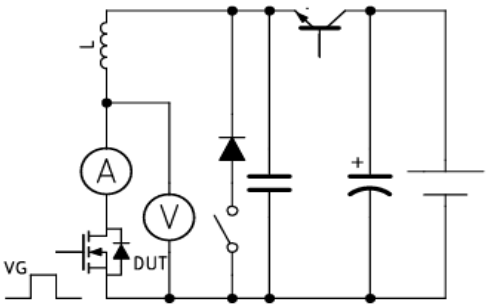


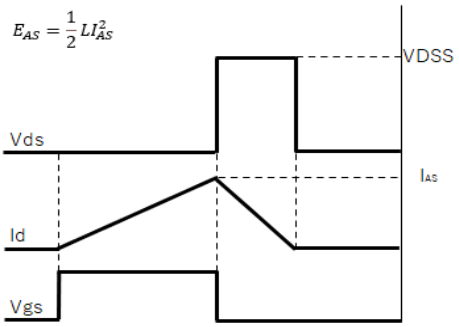
Test Circuit 7
Swiching Tim



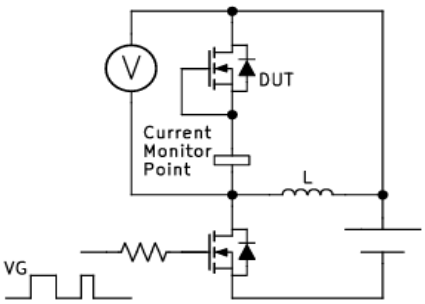


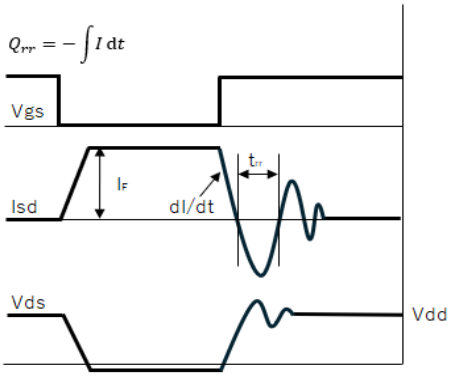
Test Circuit 8
IAS





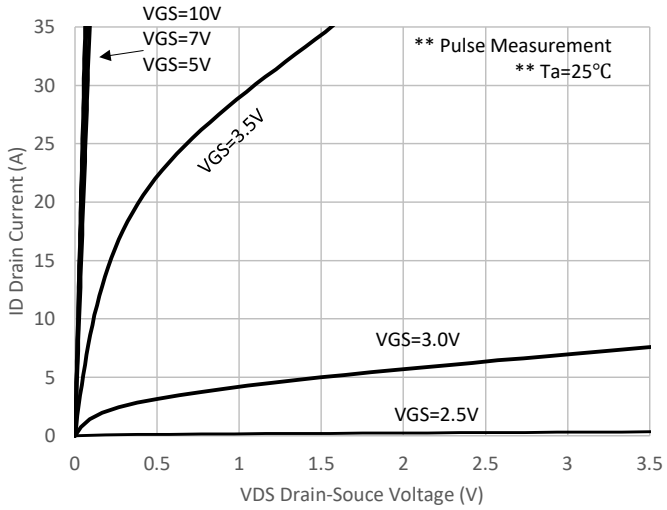
Test Circuit 9
trr/Qrr



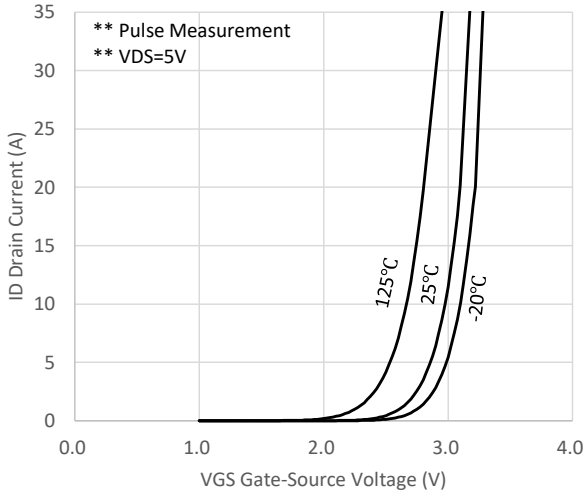


Technical data

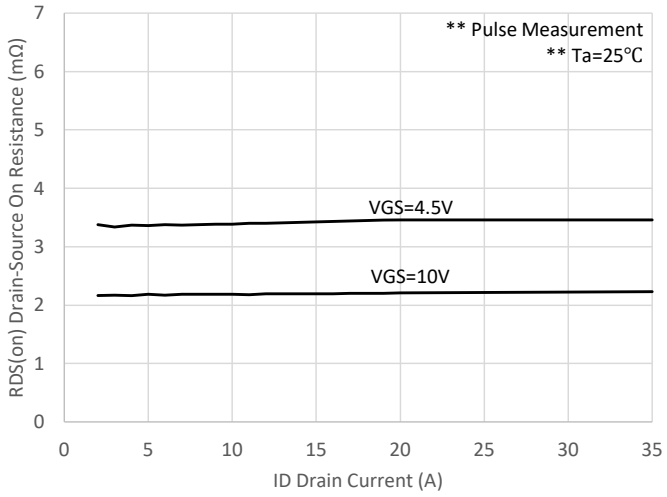
ID to VDS



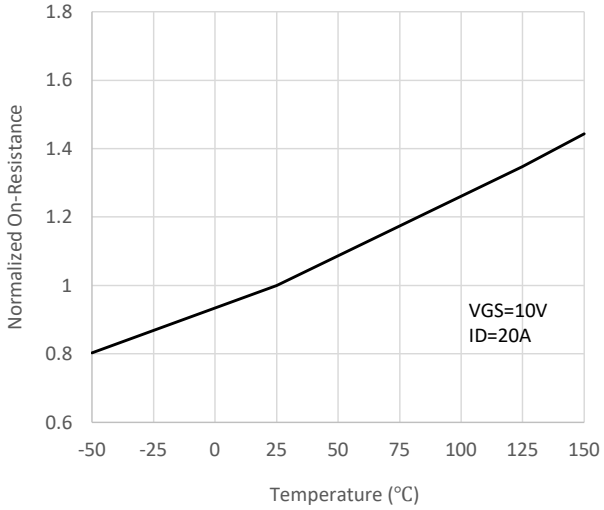
ID to VGS



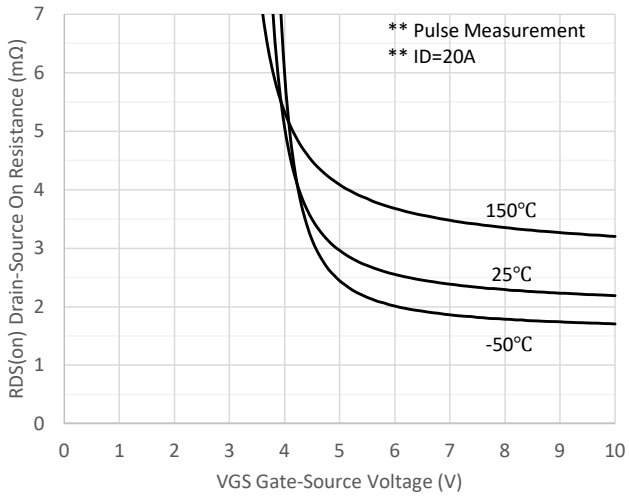
RDS(on) to ID



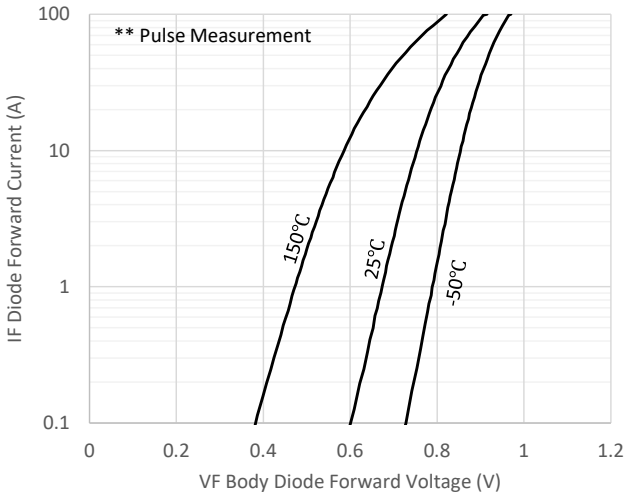
On-Resistance vs Junction Temperature



RDS(on) to VGS

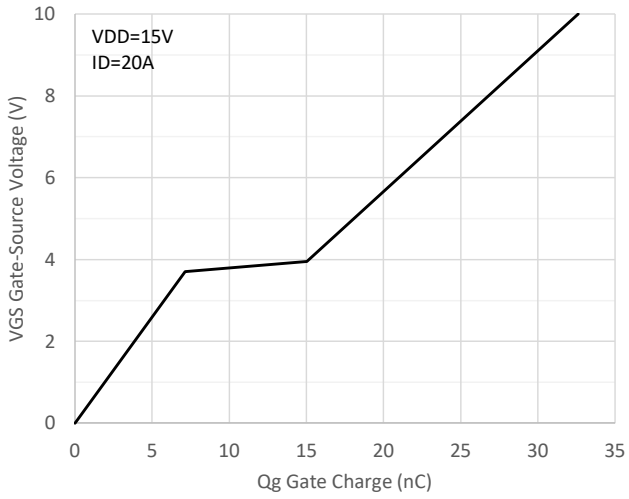


IF to VF

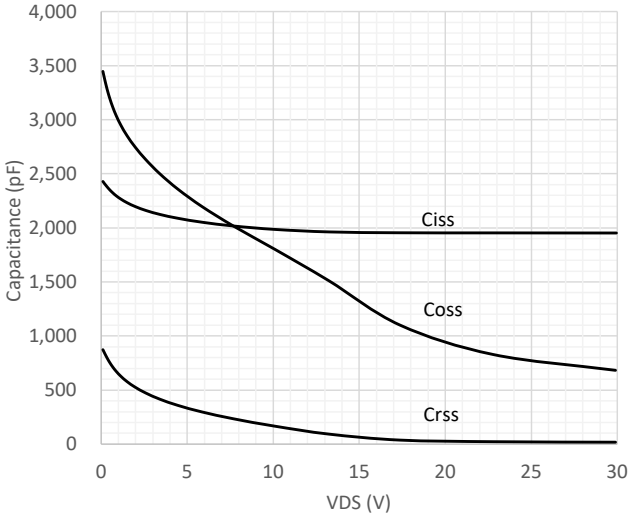


Technical data

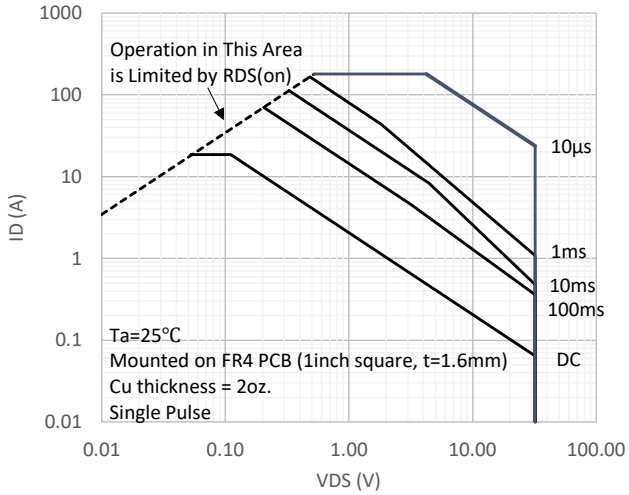
Gate-Charge Characteristics



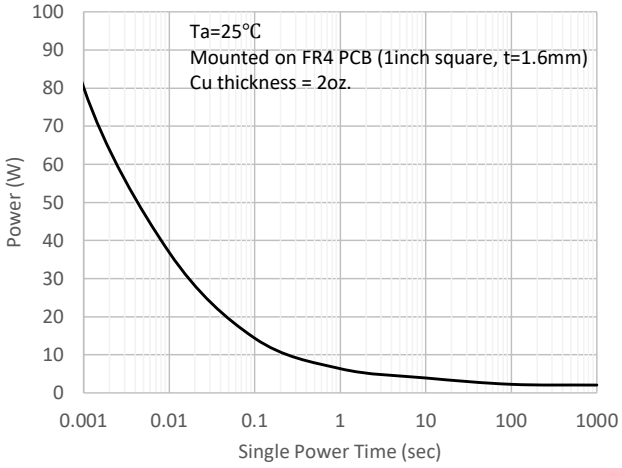
Capacitance Characteristic



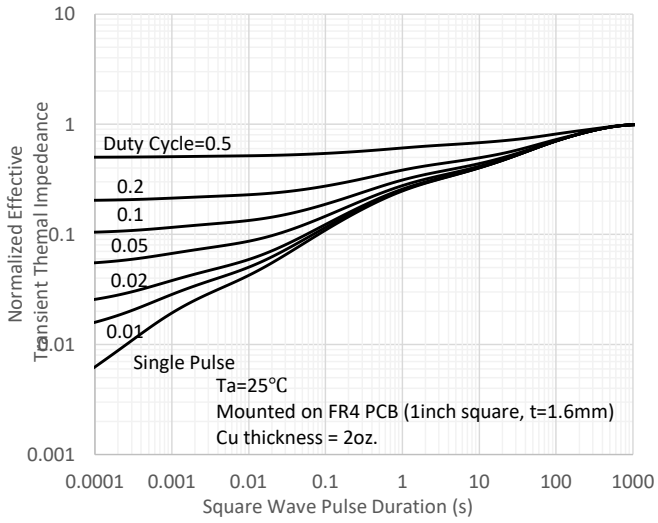
SOA



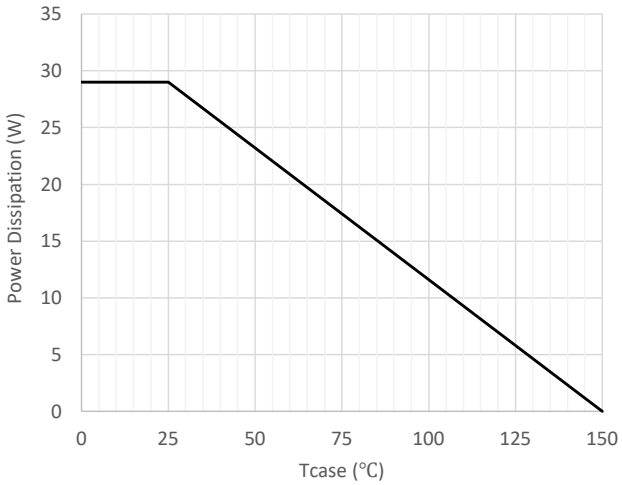
Single Pulse Maximum Power Dissipation



Thermal Response

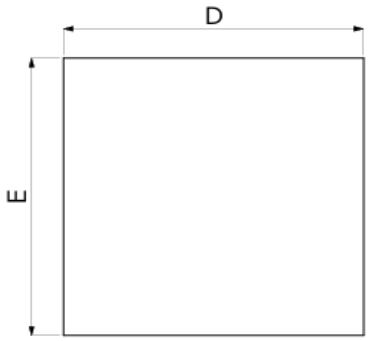


Power Derating



Package Outline Dimensions

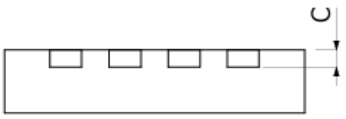
Top View



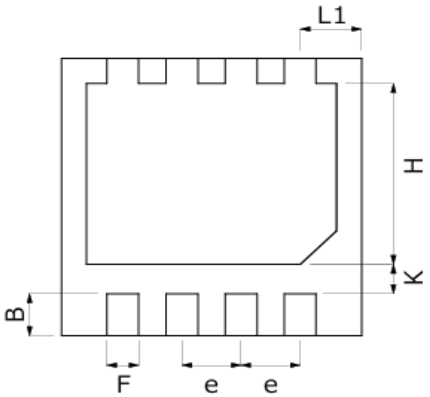
Side View



Side View



Bottom View

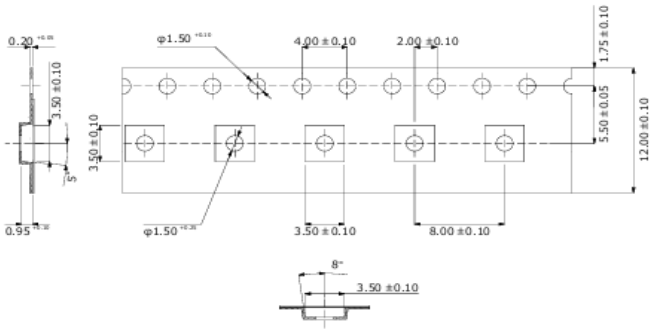


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.700	0.750	0.800
B	0.400	0.500	0.600
C	0.153	0.203	0.253
D	3.200	3.300	3.400
E	3.200	3.300	3.400
e	0.600	0.650	0.700
F	0.300	0.350	0.400
H	2.050	2.150	2.250
K	0.250	0.350	0.400
L	2.650	2.750	2.800
L1	0.575	0.675	0.775

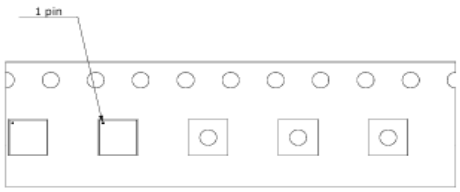
Form

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

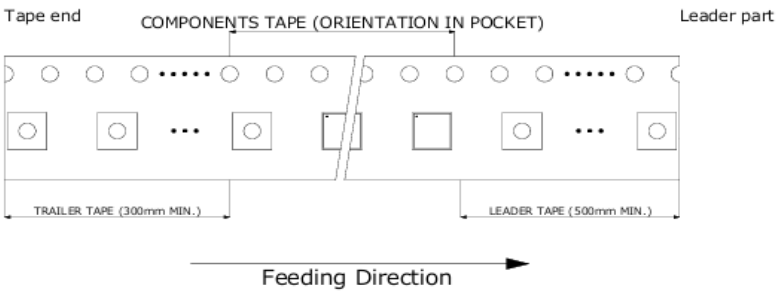
Tape size (mm)



Pin1 Direction



Tape end ~ Leader part (mm)



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