

Features

- Fast switching
- Uses advanced SGT technology
- Low reverse transfer capacitances
- Low gate charge and Low on-resistance
- 100% avalanche tested

Product Summary			
V _{DS}	R _{DS(on)} (mΩ) Typ	I _D (A)	Q _g (Typ)
-150V	175 @ -10V -5A	-12	20nc

Mechanical Data

- Case:TO-252 Package

Application

- Power switching applications
- DC-DC converters
- Motor control

TO-252
D12P15M



Ordering Information

Part No.	Package Type	Package	Quality(box)
DS12P15M	TO-252	Tape & Reel	2500

Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

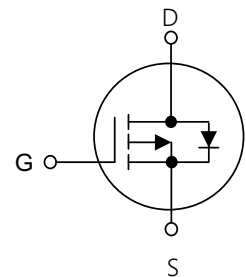


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	-150	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current (Note 5)	I _D	T _c =25°C	-12
		T _c =100°C	-8
Pulsed Drain Current (Note 1)	I _{DM}	-48	A
Single Pulse Avalanche Energy(Note 2)	E _{AS}	72	mJ
Power Dissipation	P _D	T _a =25°C	1.3
		T _c =25°C	66
Operating Junction and Storage Temperature	T _J /T _{STG}	-55~+150	°C

Table 2. Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance Junction to Ambient,Max	$R_{\theta JA}$	95	$^{\circ}\text{C}/\text{W}$
Thermal resistance Junction to Case,Max	$R_{\theta JC}$	1.9	$^{\circ}\text{C}/\text{W}$

Table 3. Electrical Characteristics ($T_c=25^{\circ}\text{C}$, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D = -250μA	-150	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = -150V,V _{GS} =0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V,V _{DS} =0V	-	-	100	nA
	Reverse		V _{GS} = -20V,V _{DS} =0V	-	-	-100	nA
On Characteristics(Note 3)							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D = -250μA	-1.3	-	-2.4	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} = -10V,I _D = -5A	-	175	220	mΩ
			V _{GS} = -4.5V,I _D = -5A	-	195	260	
Dynamic Characteristics(Note 4)							
Input Capacitance	C _{ISS}	V _{DS} = -75V,V _{GS} =0V,f=1MHz	-	1450	-	pF	
Output Capacitance	C _{OSS}		-	65	-	pF	
Reverse Transfer Capacitance	C _{RSS}		-	4.4	-	pF	
Transconductance	g _{fs}	V _{DS} = -5V,I _D = -5A	-	15	-	S	
Switching Characteristics (Note 4)							
Turn-On Delay Time	td(on)	V _{DD} = -50V,I _D = -5A, V _{GS} = -10V,R _{GEN} =3Ω,	-	8	-	ns	
Turn-On Rise Time	t _{TR}		-	11	-	ns	
Turn-Off Delay Time	td(off)		-	24	-	ns	
Turn-Off Fall Time	t _f		-	4	-	ns	
Total Gate Charge	Q _G	V _{DD} = -75V,I _D = -5A, V _{GS} = -10V	-	20	-	nC	
Gate-Source Charge	Q _{GS}		-	4	-	nC	
Gate-Drain Charge	Q _{GD}		-	2.2	-	nC	
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V,I _S = -5A	-	-	-1.2	V	
Maximum Continuous Drain-Source Diode Forward Current	I _S		-	-	-12	A	
Reverse Recovery Time	trr	V _{GS} =0V,I _F = -5A dI _F /dt= -100A/μs(Note 1)	-	57	-	ns	
Reverse Recovery Charge	Q _{RR}		-	157	-	nC	

Notes: 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 $L=0.5\text{mH}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
3 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
4 Guaranteed by design, not subject to production
5 The maximum current is limited by the package.

Typical Characteristics Diagrams

Figure 1. Output Characteristics

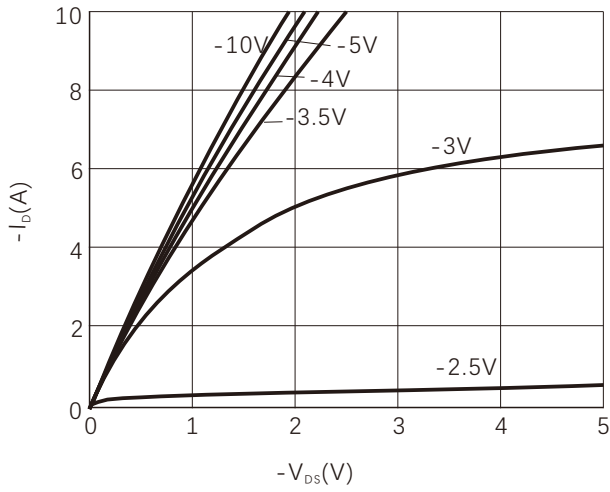


Figure 2. Normalized $R_{DS(on)}$ vs Temperature

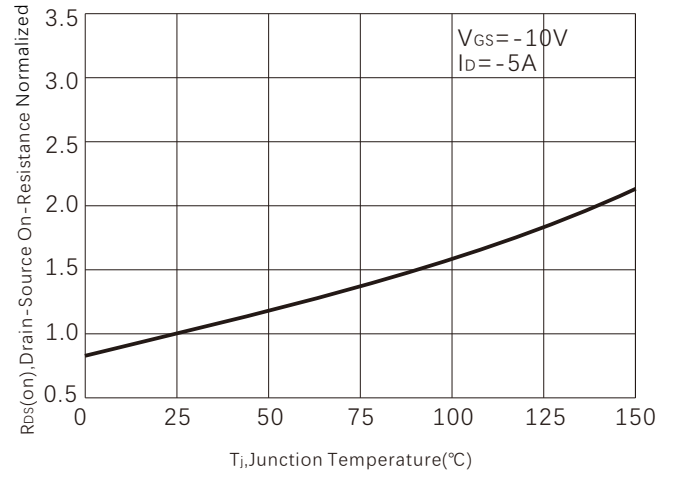


Figure 3. On-Resistance vs. Drain Current

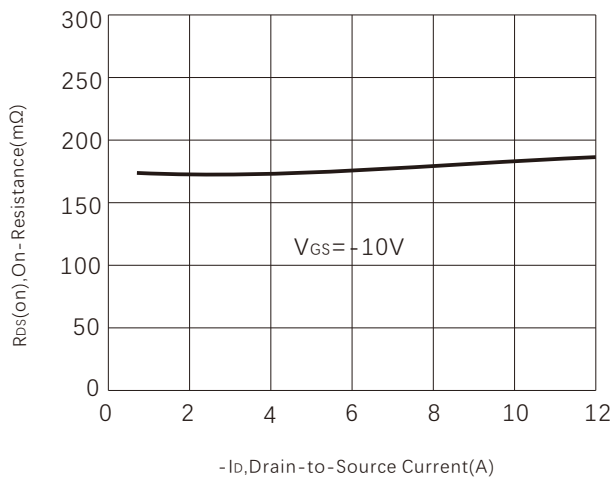


Figure 4. Capacitance

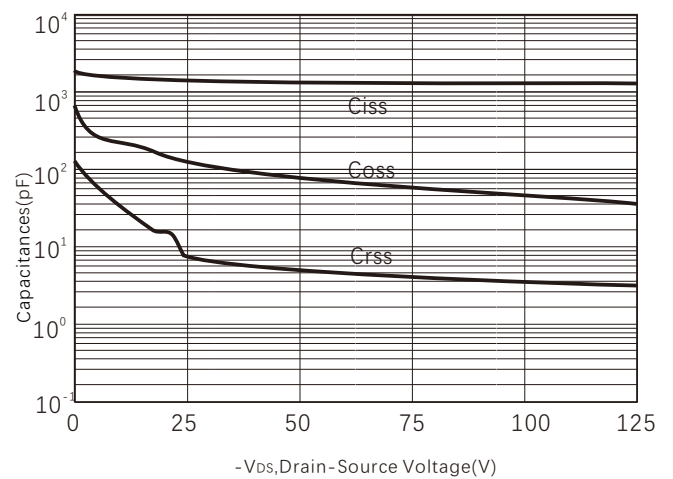


Figure 5. Gate charge

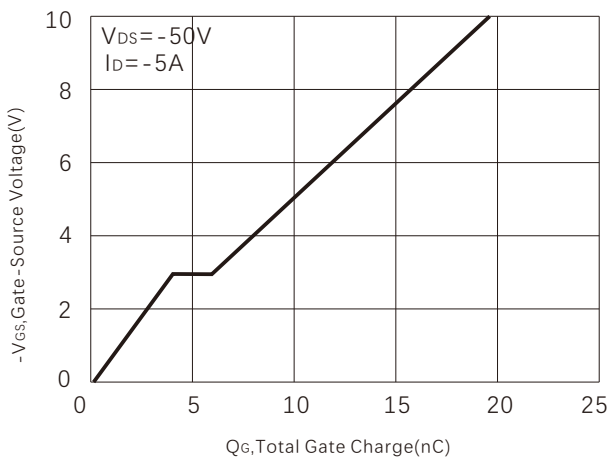


Figure 6. Transfer Characteristics

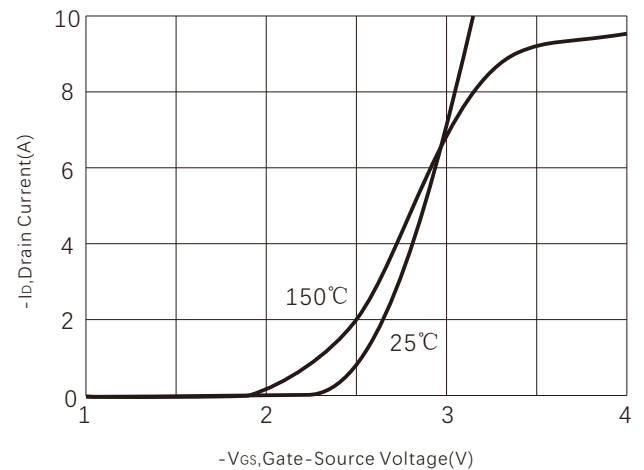


Figure7.Maximum Drain Current vs Temperature

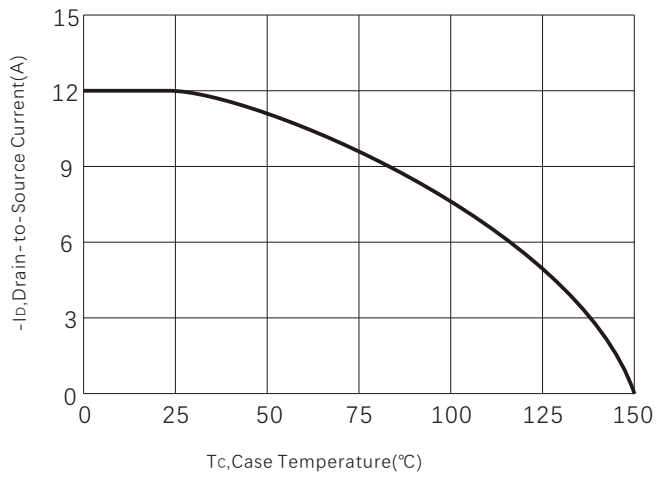


Figure 8. Power dissipation

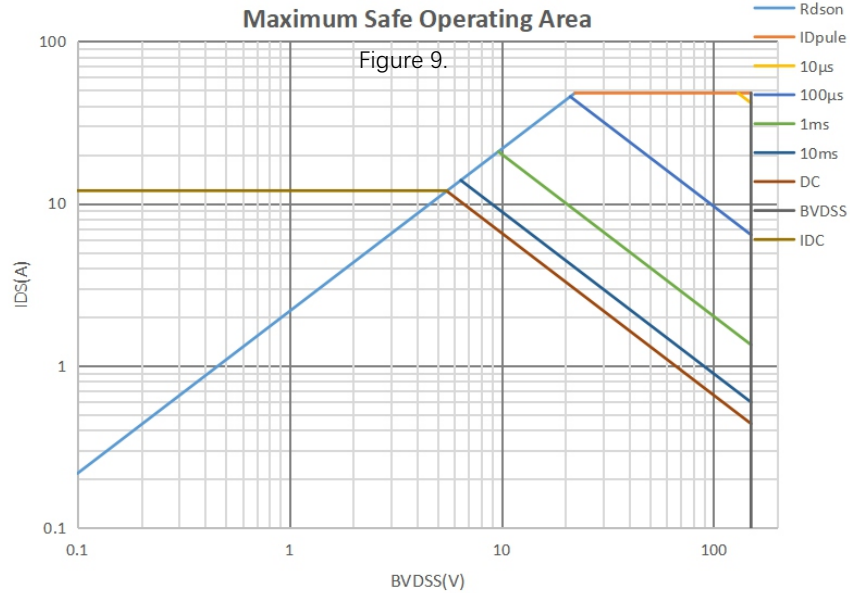
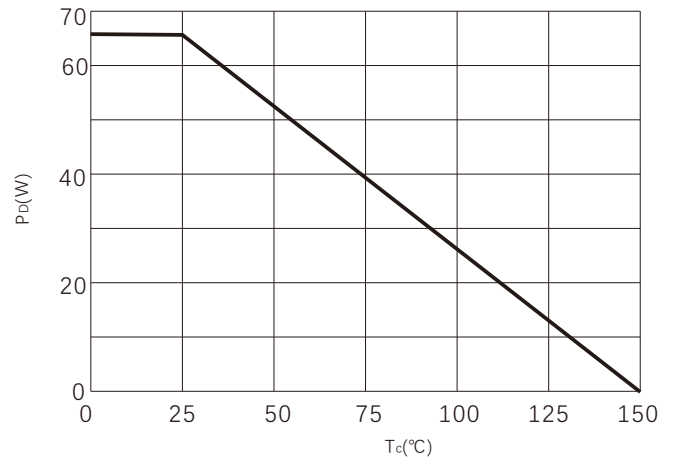
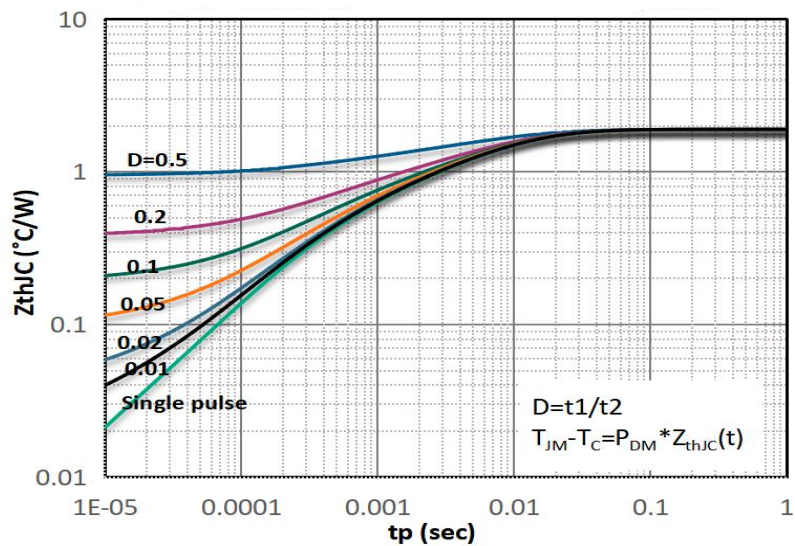
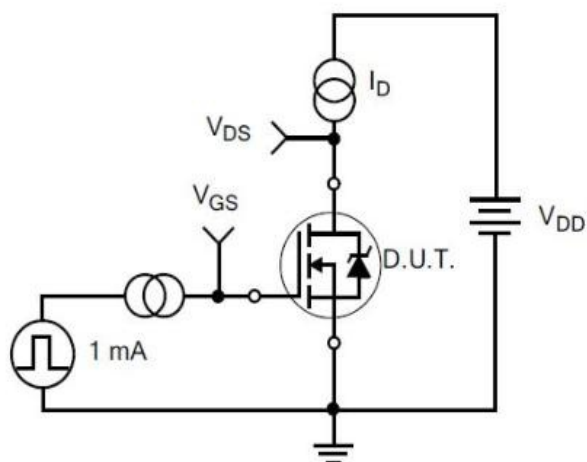


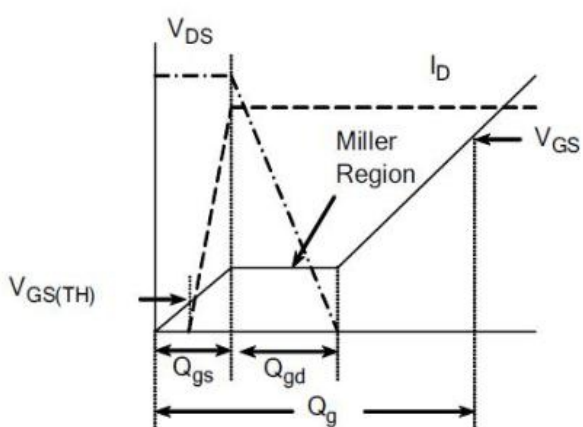
Figure 10.Maximum Transient Thermal Impedance



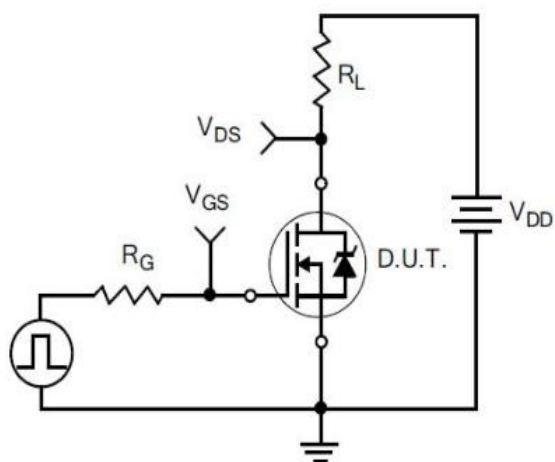
Typical Test Circuit



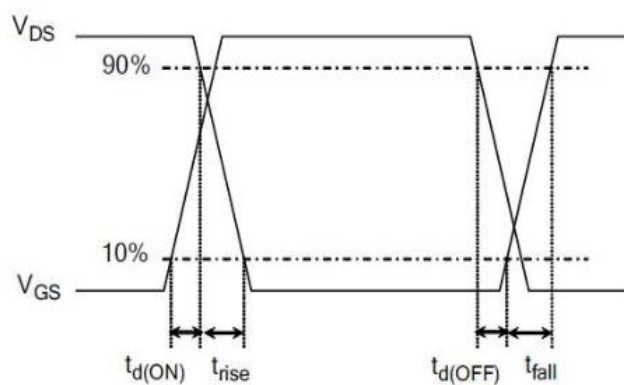
1) Gate Charge Test Circuit



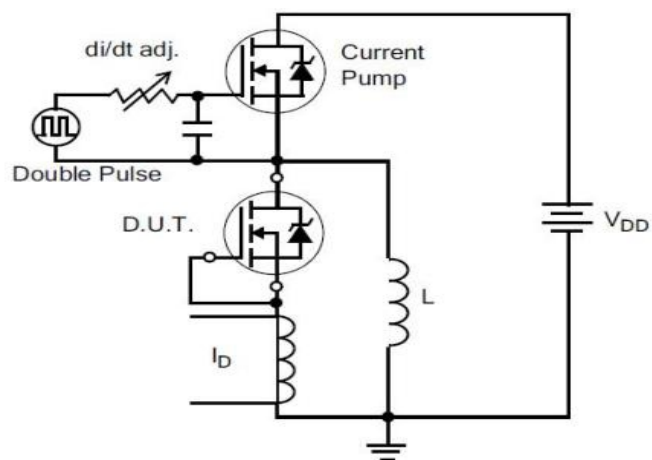
2) Gate Charge Waveform



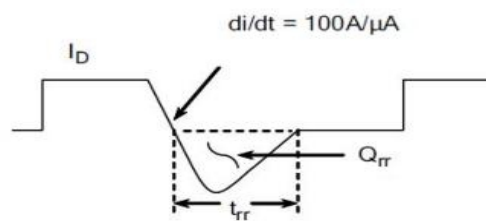
3) Resistive Switching Test Circuit



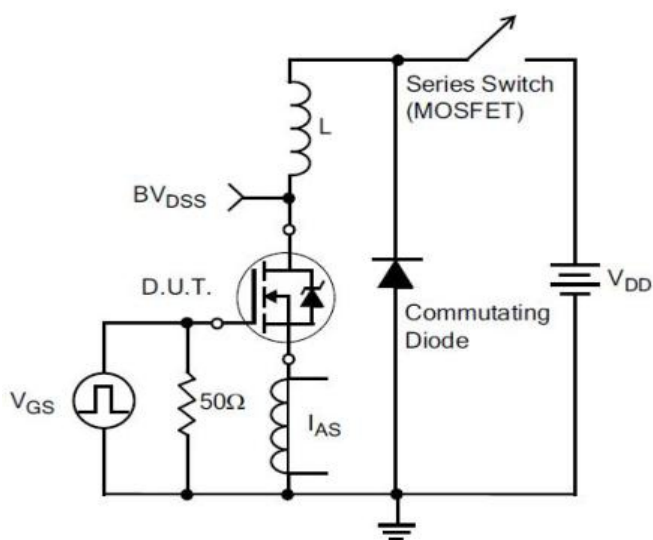
4) Resistive Switching Waveforms



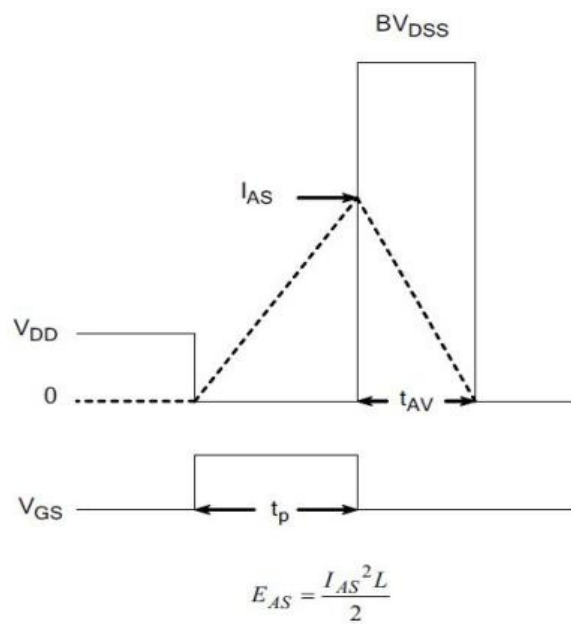
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

Product Names Rules

X X X N E X X X

Process Type:
VDMOS:default
Super junction:SJ
Low Voltage trench:D

Rated Current Code
With 1-2 Digital,
For Ex ample:
4A:4,
10A:10,
0.8A:08

Channel Code
N channel:N
P channel:P

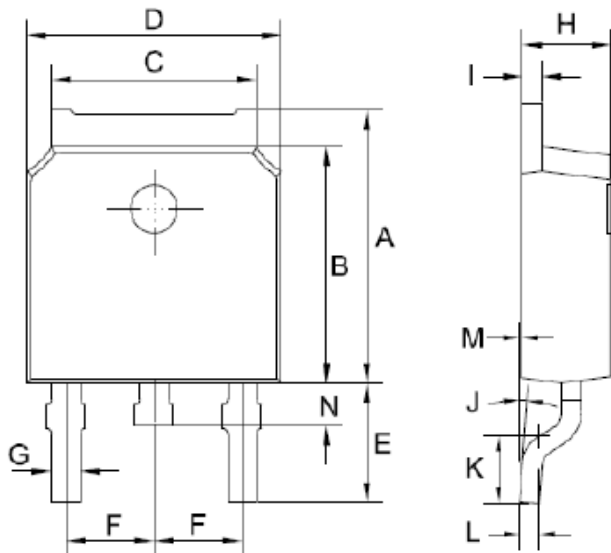
Package Code
TO-220:Default
ITO-220:F
TO-262:E
TO-263:D
TO-252:M
TO-251:N
TO-263-7L:D7

Rated Voltage Code
With 2 Digital,For Example:
600V:60
60V:06

Special Function Code
G-S ESD Protection:E
No Protection:Default

Dimensions

TO-252 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	6.85	7.25	0.270	0.285
B	5.8	6.3	0.228	0.248
C	5	5.53	0.197	0.218
D	6.3	6.8	0.248	0.268
E	2.6	3.3	0.102	0.130
F	2.19	2.39	0.086	0.094
G	0.45	0.85	0.018	0.033
H	2.2	2.4	0.087	0.094
I	0.41	0.61	0.016	0.024
J	0°	8°	0°	8°
K	1.45	1.85	0.057	0.073
L	0.41	0.61	0.016	0.024
M	0	0.12	0.000	0.005
N	0.6	1	0.024	0.039

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