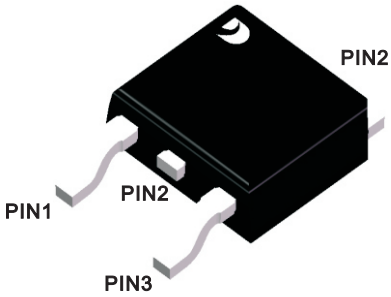
47A 100V N-CHANNEL POWER MOSFET

TO-252W(Prefix :D)



RoHS COMPLIANT

Description

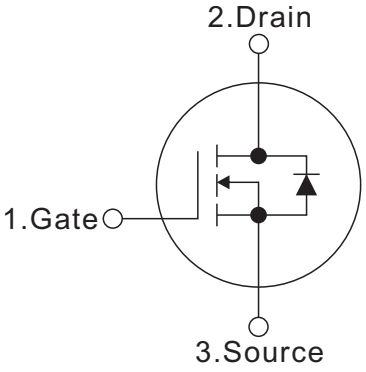
The uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.

Features

- $R_{DS(ON)}$ < 22 mΩ @ V_{GS}=10V, I_D=25A
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

Mechanical data

- Case: TO-252W
- Approx. Weight: 0.33g (0.012oz)
- RoHS compliant
- Case Material: “Green” molding compound, UL flammability classification 94V-0,“Halogen-free”.



Absolute Maximum Ratings (Ta=25°C, Unless Otherwise Specified)

Parameter	Symbols	Ratings	Units
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current Tc=25°C Tc=100°C	I_D	47 31	A
Pulsed Drain Current (Note 2)	I_{DM}	200	A
Avalanche Energy Single Pulsed (Note 3)	E_{AS}	150	mJ
Power Dissipation (Tc = 25°C)	P_D	115	W
Operating junction and storage temperature	T_J,T_{STG}	-55 ~+150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L = 0.5mH, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C

Thermal Resistance

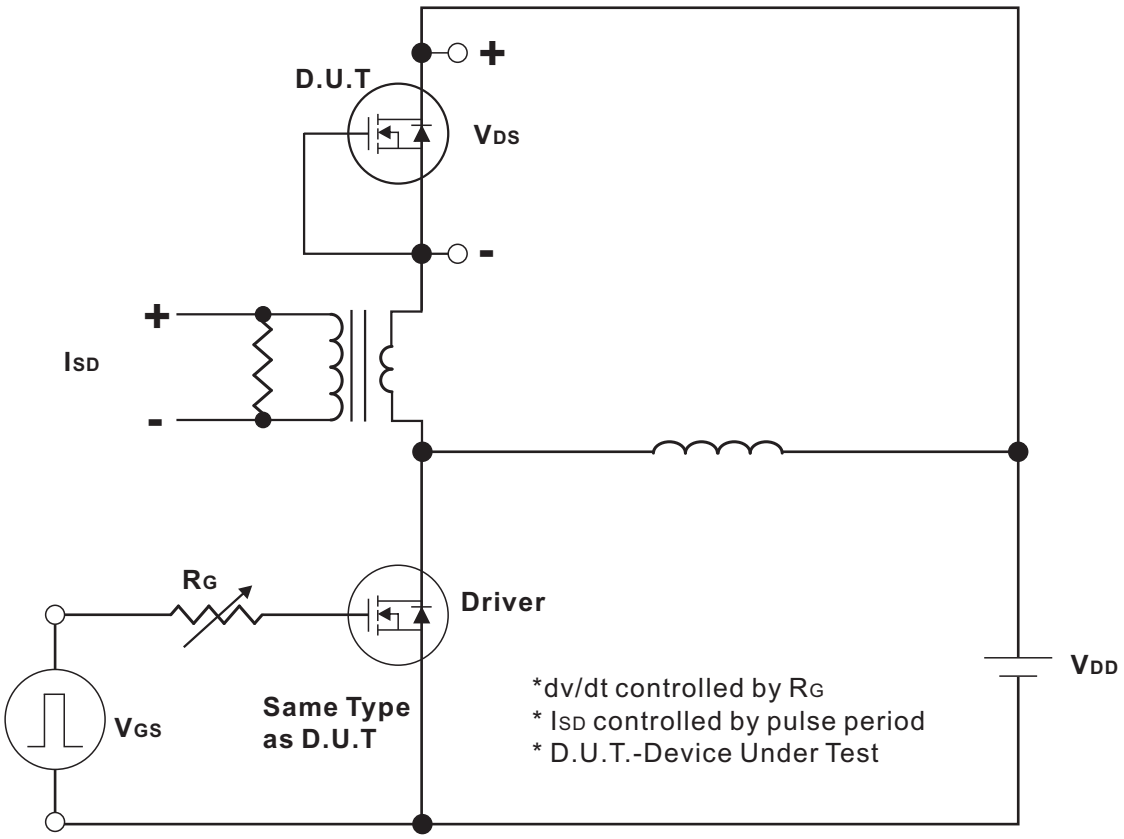
Parameter	Symbols	Ratings	Units
Thermal resistance, junction – case.	R_{thJC}	1.3	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	130.4	°C/W

Electrical Characteristics (ta=25°c, Unless Otherwise Specified)

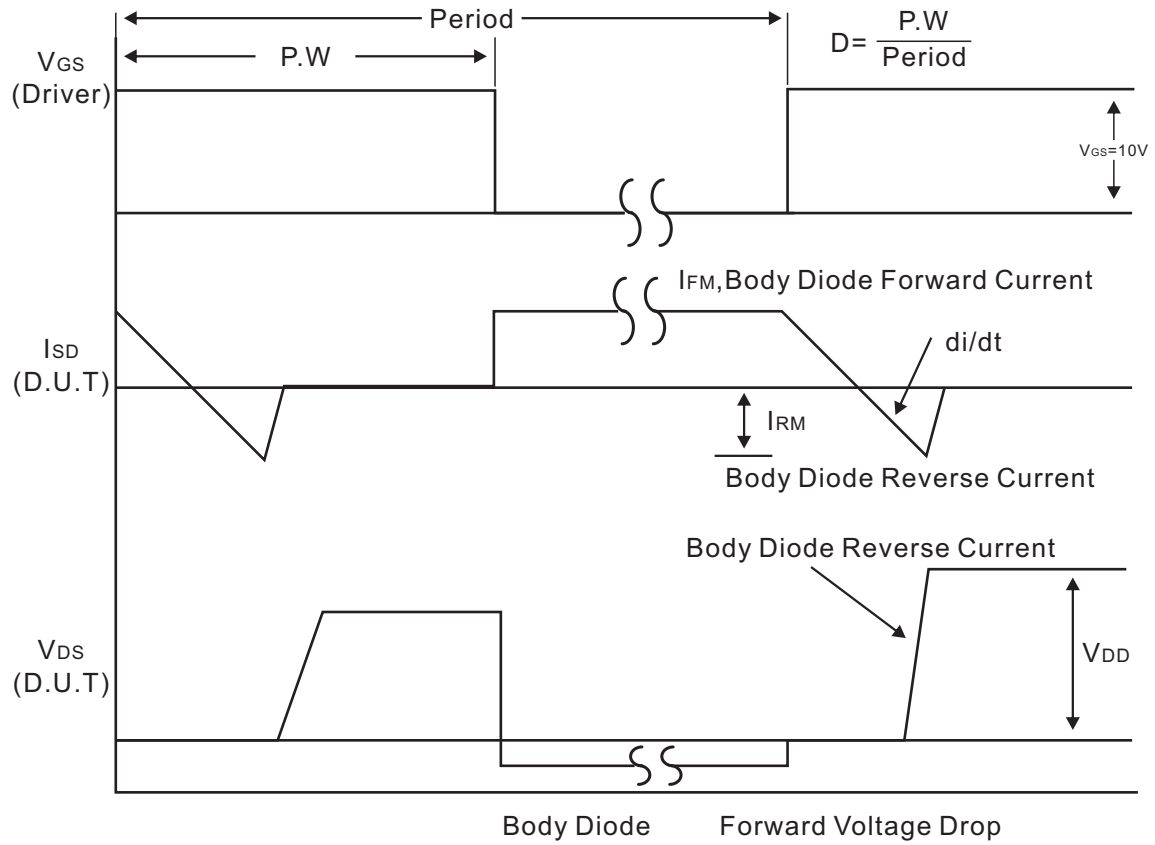
Parameter		Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250uA	100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=100V,V_{GS}=0V			1.0	uA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V,V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V,V_{DS}=0V			-100	
On Characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	1.0		2.3	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=25A V_{GS}=4.5V,I_D=20A		18 23	22 30	mΩ
Transconductance		g_{fs}	V_{DS}=5V,I_D=15A		30		S
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V,		1322		pF
Output Capacitance		C_{OSS}	V_{GS}=0V,		358		pF
Reverse Transfer Capacitance		C_{RSS}	f=1.0MHz		46		pF
Gate resistance		R_G			1.5		Ω
Switching Characteristics							
Total Gate Charge (Note 1)		Q_G	V_{DS}=80V,V_{GS}=10V		17		nC
Gate-Source Charge		Q_{GS}	I_D=47A		8.1		nC
Gate-Drain Charge		Q_{GD}	(NOTE1,2)		2.3		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=50V,I_D=47A		24		ns
Turn-On Rise Time		t_R	R_G=25Ω,V_{GS}=10V		13		ns
Turn-Off Delay Time		$t_{D(OFF)}$	(NOTE1,2)		27		ns
Turn-Off Fall Time		t_F			10		ns
Drain-Source Diode Characteristics And Maximum Ratings							
Maximum Body-Diode Continuous Current		I_S				47	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_{SD}=20A,V_{GS}=0V			1.3	V
Reverse Recovery Time (Note 1)		trr	I_F=47A		62		ns
Reverse Recovery Charge		Qrr	di/dt=100A/us		84		nC

Notes:
1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

Test Circuits and waveforms

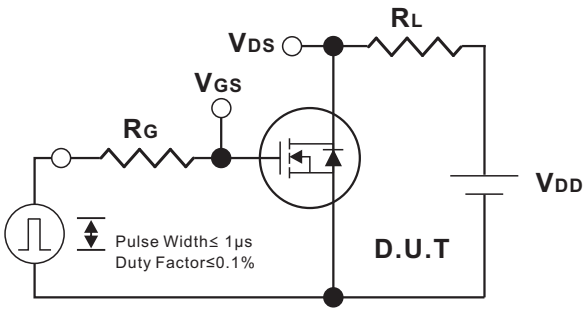


Peak Diode Recovery dv/dt Test Circuit

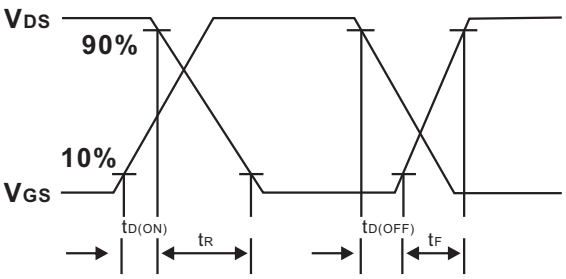


Peak Diode Recovery dv/dt Waveforms

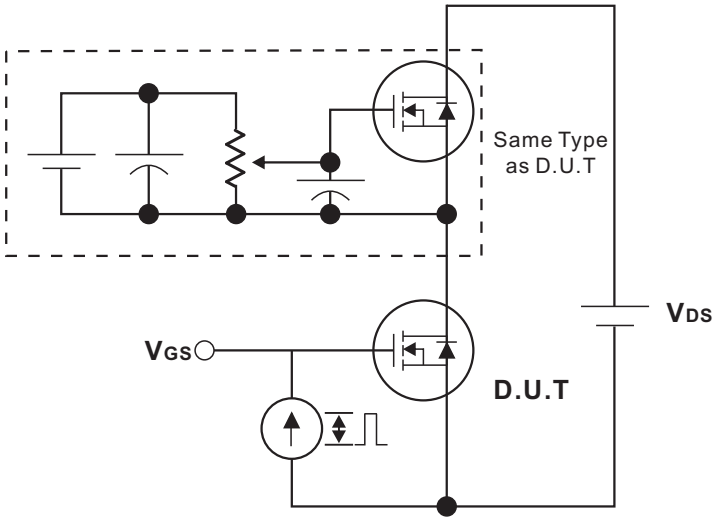
Test Circuits and waveforms



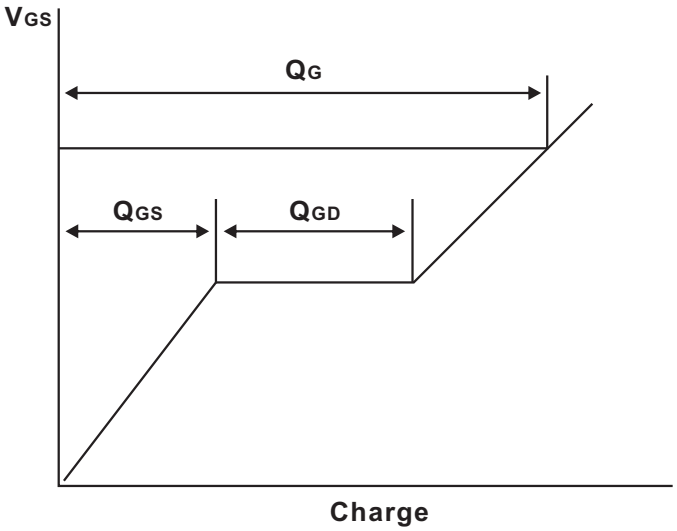
Switching Test Circuit



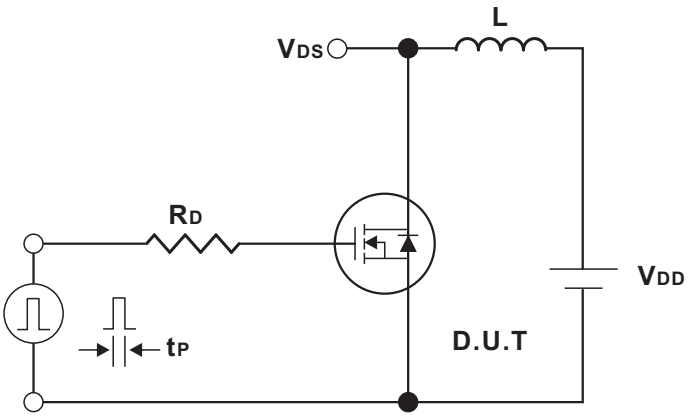
Switching Waveforms



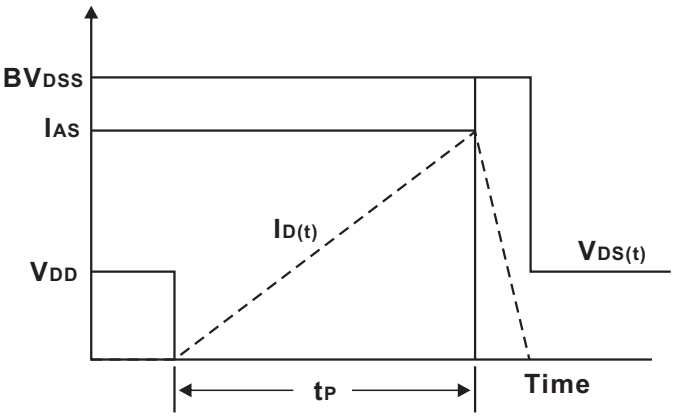
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Typical Characteristics

Fig.1 Typical Output Characteristics

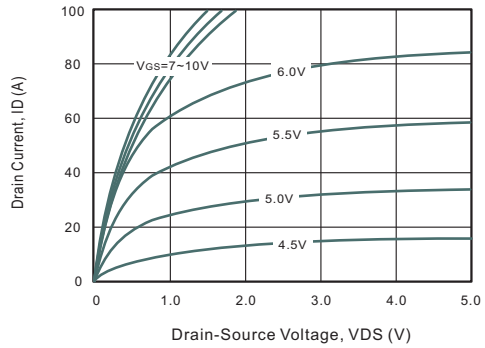


Fig.2 Power Dissipation

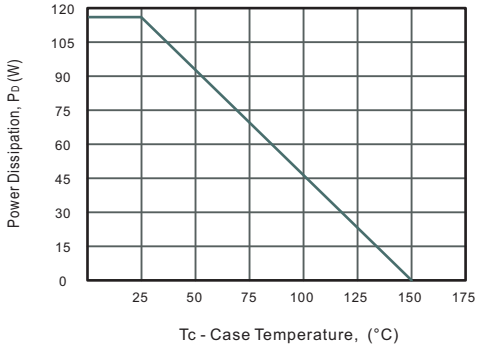


Fig.3 Drain Current Derating

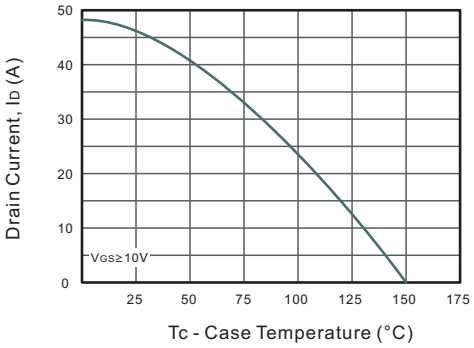


Fig.4 Drain-Source On-Resistance vs. Drain Current

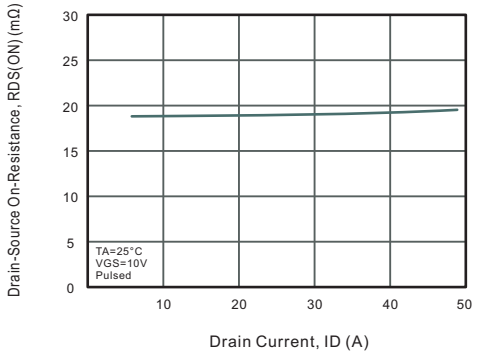


Fig.5 Gate Threshold Voltage vs. Junction Temperature

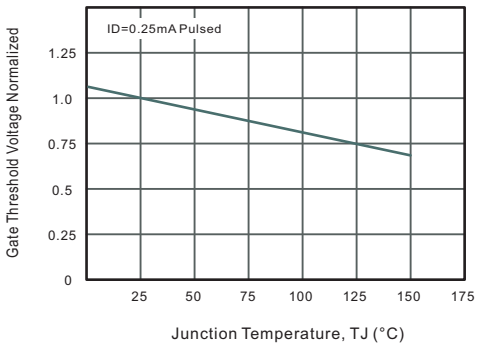


Fig.6 Body-diode Forward Characteristics

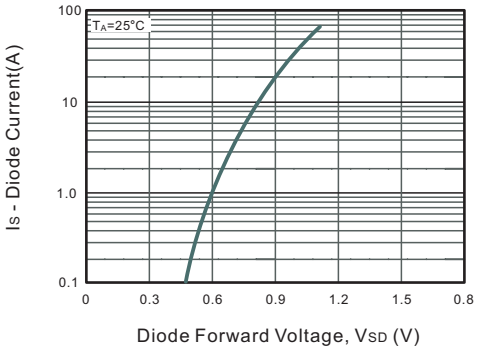


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

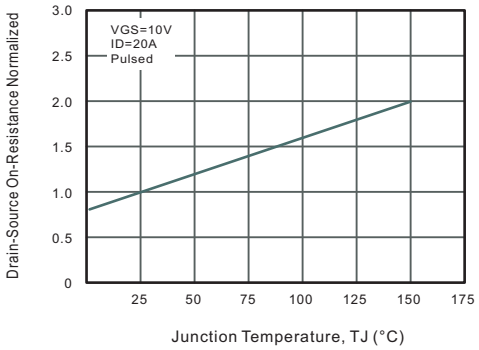
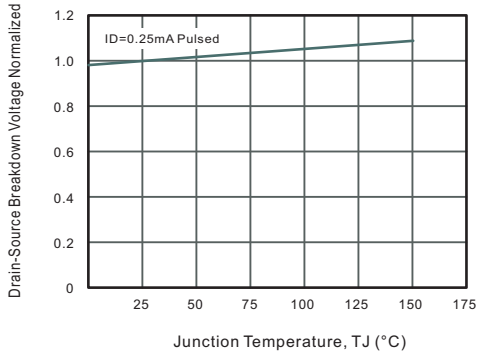


Fig.8 Breakdown Voltage vs. Junction Temperature



Typical Characteristics

Fig.9 Capacitance Characteristics

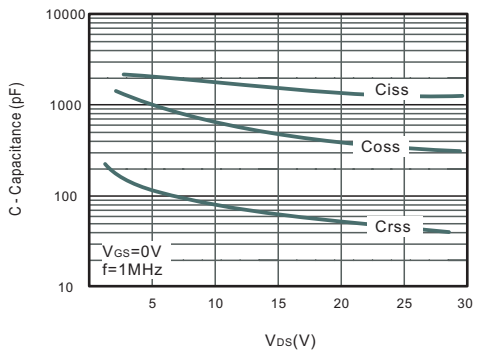


Fig.10 Gate Charge Characteristics

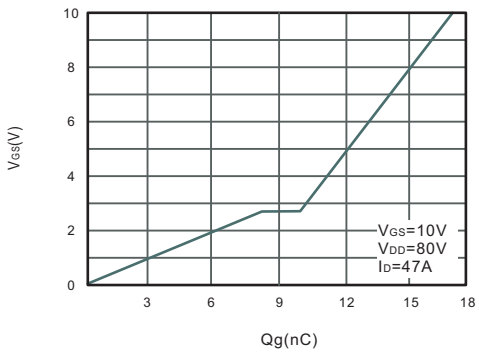


Fig.11 Safe Operating Area

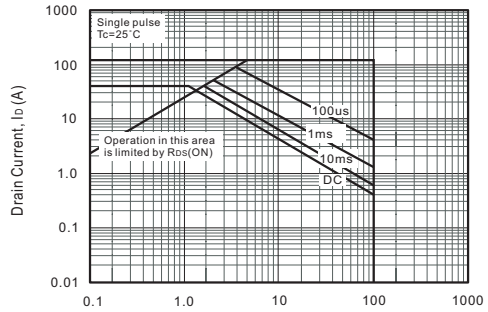
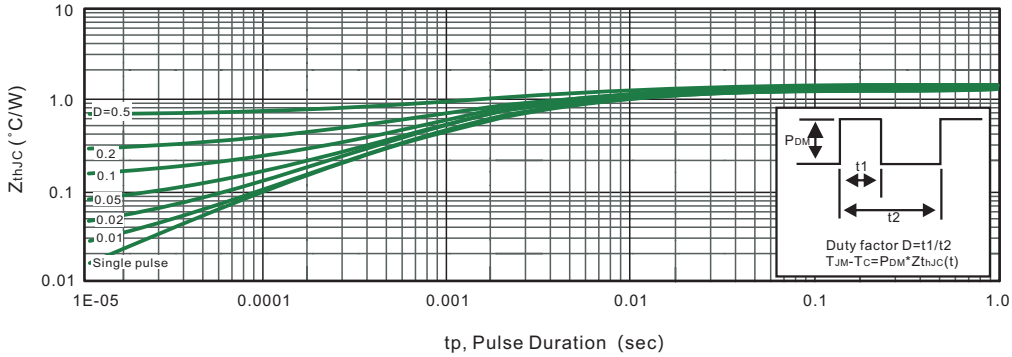
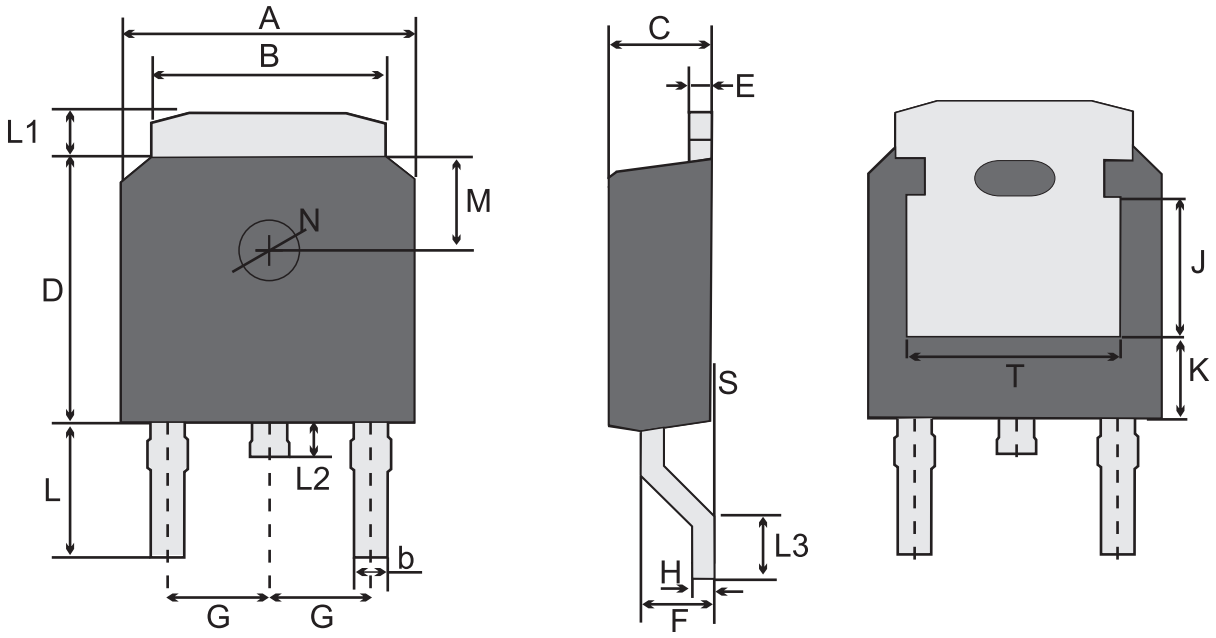


Fig.12 Max. Transient Thermal Impedance



TO-252W(D-PAK) Package Outline Dimensions



TO-252W(D-PAK)Mechanical data

UNIT		A	B	b	C	D	E	F	G	H	L	L1	L2	L3	S	M	N	J	T	K
mm	max	6.7	5.53	0.86	2.5	6.3	0.61	1.87	2.3 typ.	0.55	3.0	1.2	1.0	1.75	0.1	1.8 typ.	1.3 typ.	3.2 ref.	4.83 ref.	1.8 ref.
	typ	6.6	5.33	0.76	2.3	6.1	0.51	1.57		0.50	2.8	1.0	0.8	1.30	0.05					
	min	6.3	5.13	0.66	2.1	5.9	0.41	1.27		0.45	2.6	0.8	0.6	1.0	/					
mil	max	264	218	34	98	248	24	74	91 typ.	22	118	47	39	69	3.9	71 typ.	51 typ.	126 ref.	190 ref.	71 ref.
	typ	260	210	30	91	240	20	62		20	110	39	31	51	2.0					
	min	248	202	26	83	232	16	50		18	102	31	24	39	/					

Marking

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