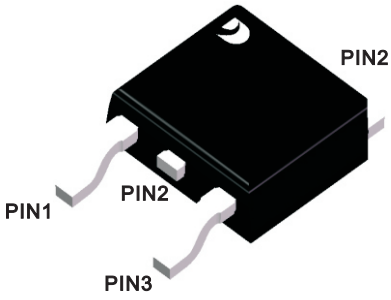
6A 800V N-CHANNEL POWER MOSFET

TO-252W(Prefix :D)



RoHS COMPLIANT

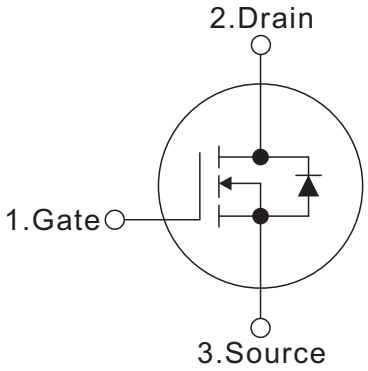
Description

The power MOSFET using **super junction** technology that can realize very low on-resistance and gate charge. It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

Features

- $R_{DS(ON)} \leq 0.83\ \Omega$ @ V_{GS}=10V, I_D=3A
- Fast switching capability
- Low On-Resistance
- 100% Avalanche tested
- 100% $\triangle V_{DS}$ tested

SYMBOL



Mechanical data

- Case: TO-252W
- Approx. Weight: 0.329g (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_{DS}	800	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current Tc=25°C Tc=100°C	I_D	6 3.8	A
Pulsed Drain Current (Note 2)	I_{DM}	18	A
Avalanche Energy Single Pulsed (Note 3)	E_{AS}	50	mJ
Power Dissipation (Tc = 25°C)	P_D	83	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=10mH,V_{DD}=50V, R_G=25Ω,Starting TJ=25°C

Thermal Resistance

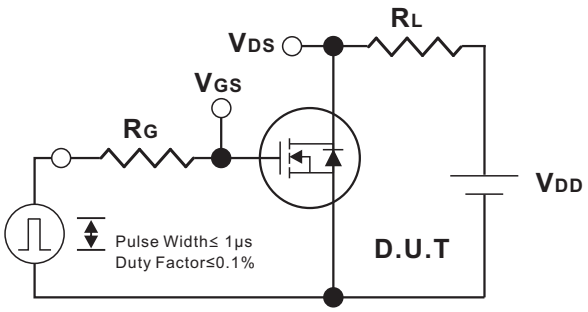
Parameter	Symbols	Ratings	Units
Thermal resistance, junction – case.	R_{thJC}	1.5	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	°C/W

Electrical Characteristics (Ta=25°C, Unless Otherwise Specified)

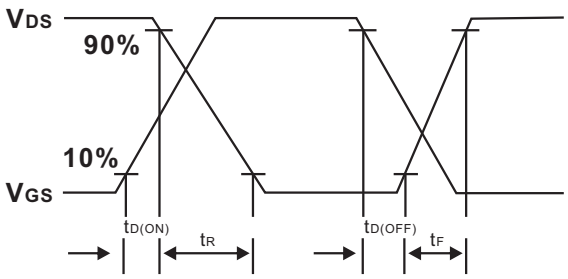
Parameter		Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250uA	800			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=800V,V_{GS}=0V			1.0	uA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=30V,V_{DS}=0V			100	nA
	Reverse		V_{GS}=-30V,V_{DS}=0V			-100	
On Characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	2.5		4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=3A		0.7	0.83	Ω
Transconductance		g_{fs}	V_{DS}=10V,I_D=3A		15		S
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=100V,		611		pF
Output Capacitance		C_{OSS}	V_{GS}=0V,		186		pF
Reverse Transfer Capacitance		C_{RSS}	f=1.0MHz		0.9		pF
Gate resistance		R_G	VDS=0V,F_{REQ}=1.00MHz		6.3		Ω
Switching Characteristics							
Total Gate Charge (Note 1)		Q_G	V_{DS}=400V,V_{GS}=10V,		17.7		nC
Gate-Source Charge		Q_{GS}	I_D=6A		2.8		nC
Gate-Drain Charge		Q_{GD}	(NOTE1,2)		6.1		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=400V,I_D=6A		10		ns
Turn-On Rise Time		t_R	R_G=4.7Ω,V_{GS}=10V		33		ns
Turn-Off Delay Time		$t_{D(OFF)}$	(NOTE1,2)		30		ns
Turn-Off Fall Time		t_F			28		ns
Drain-Source Diode Characteristics And Maximum Ratings							
Maximum Body-Diode Continuous Current		I_S				6	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_{SD}=6A,V_{GS}=0V			1.2	V
Reverse Recovery Time (Note 1)		trr	I_F=6A		248		ns
Reverse Recovery Charge		Qrr	di/dt=200A/us		2.4		uC

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

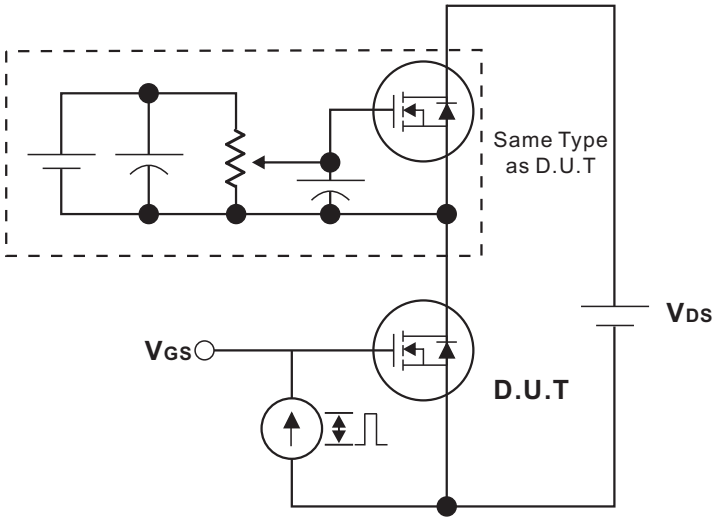
Test Circuits and waveforms



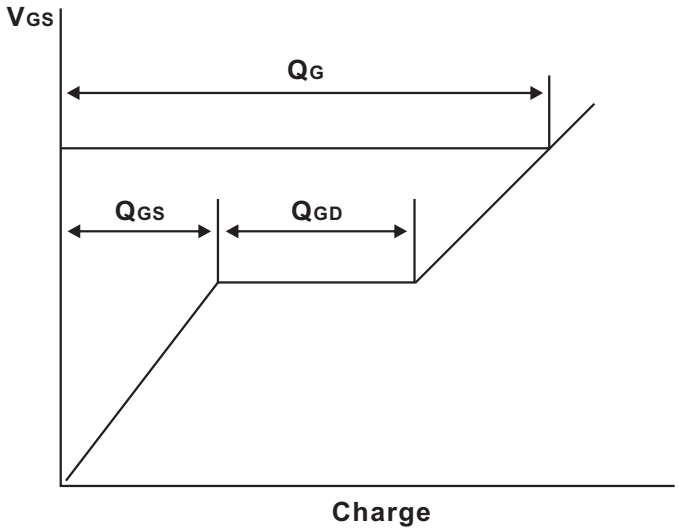
Switching Test Circuit



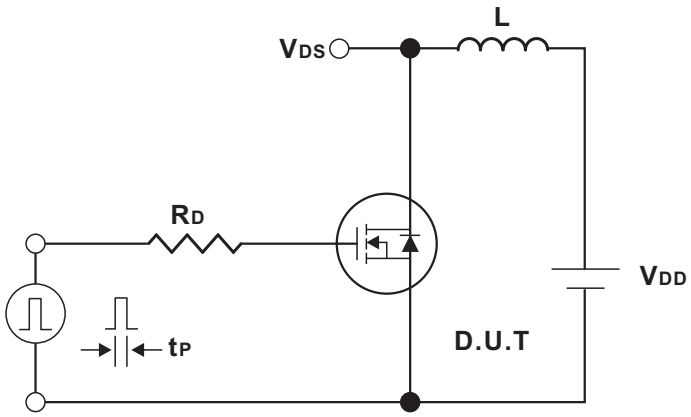
Switching Waveforms



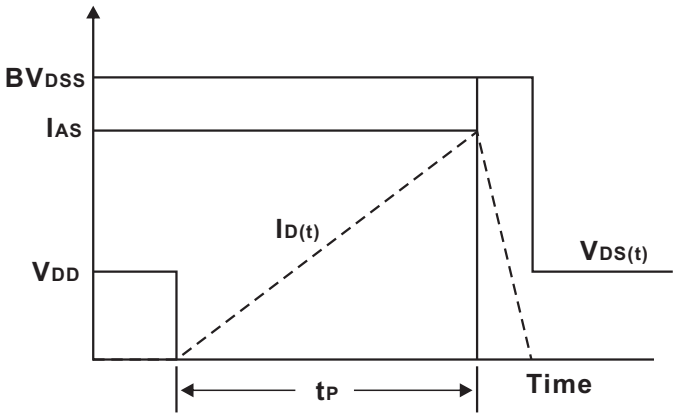
Gate Charge Test Circuit



Gate Charge Waveform

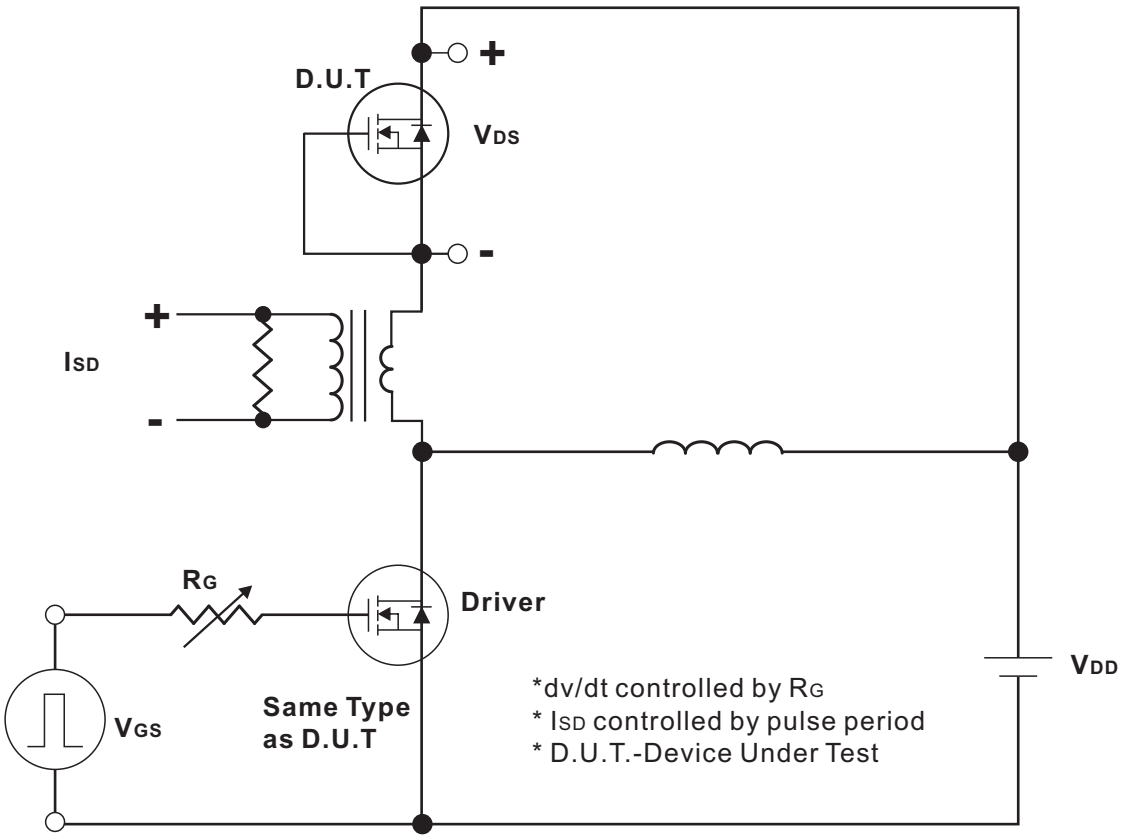


Unclamped Inductive Switching Test Circuit

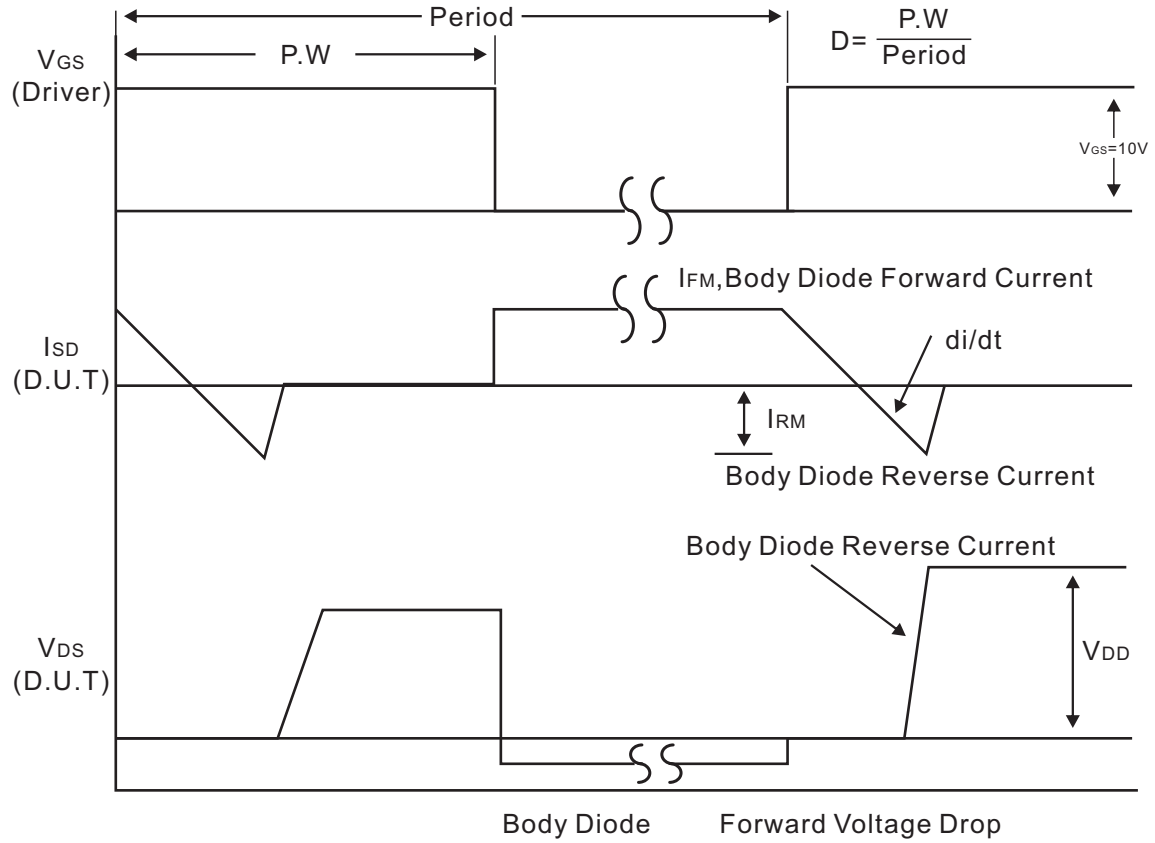


Unclamped Inductive Switching Waveforms

Test Circuits and waveforms



Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

Typical Characteristics

Fig.1 Output characteristics

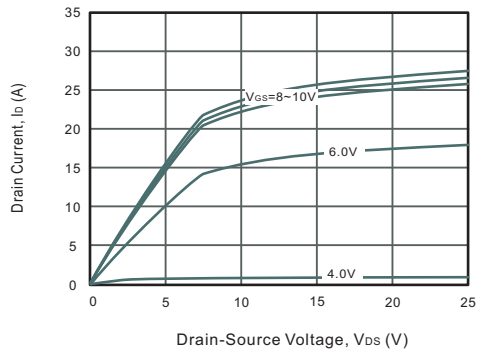


Fig.2 Power Dissipation

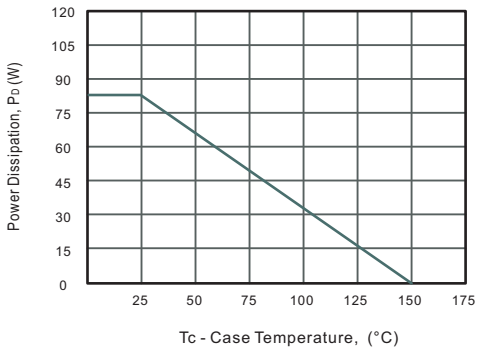


Fig.3 Drain Current Derating

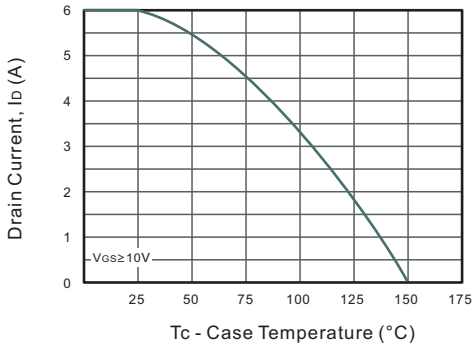


Fig.4 Drain-Source On-Resistance vs. Drain Current

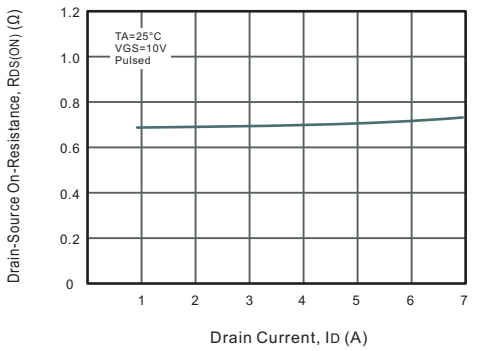


Fig.5 Gate Threshold Voltage vs. Junction Temperature

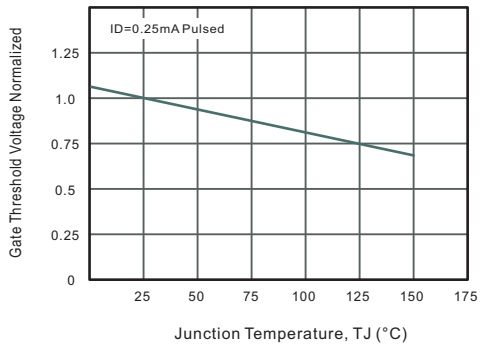


Fig.6 Body-diode Forward Characteristics

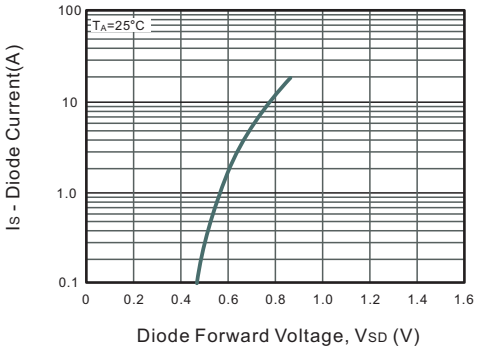


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

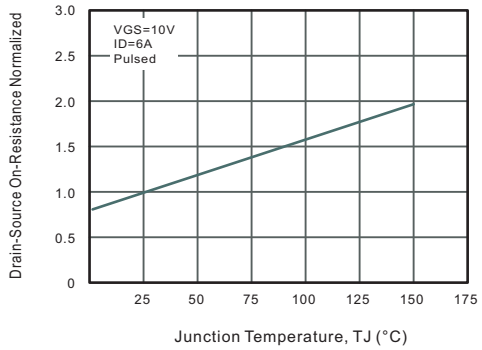
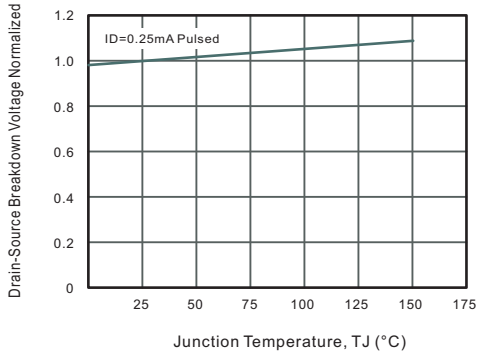


Fig.8 Breakdown Voltage vs. Junction Temperature



Typical Characteristics

Fig.9 Capacitance Characteristics

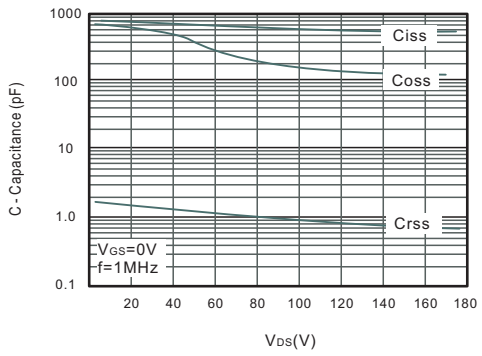


Fig.10 Gate Charge Characteristics

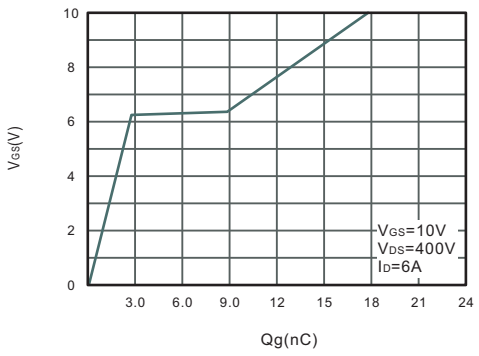


Fig.11 Safe Operating Area

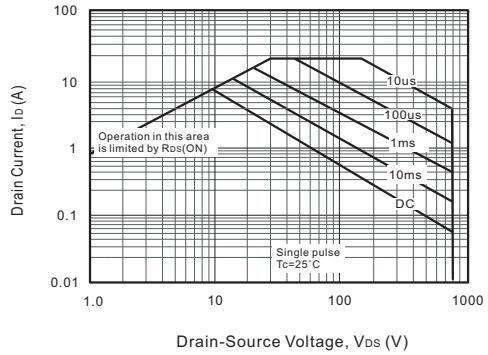
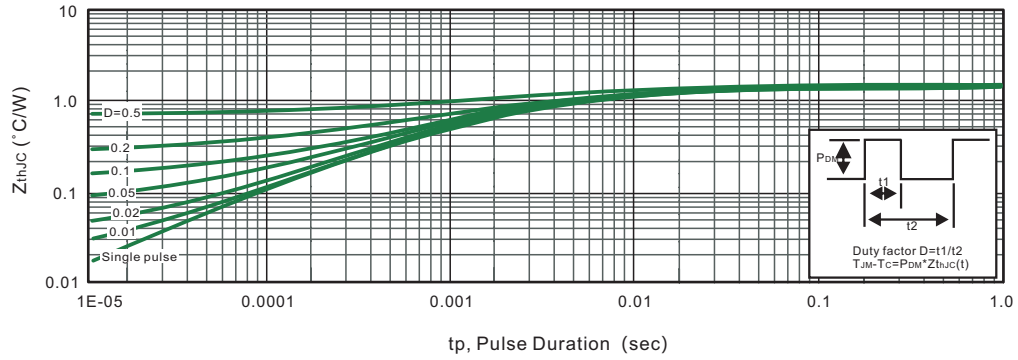
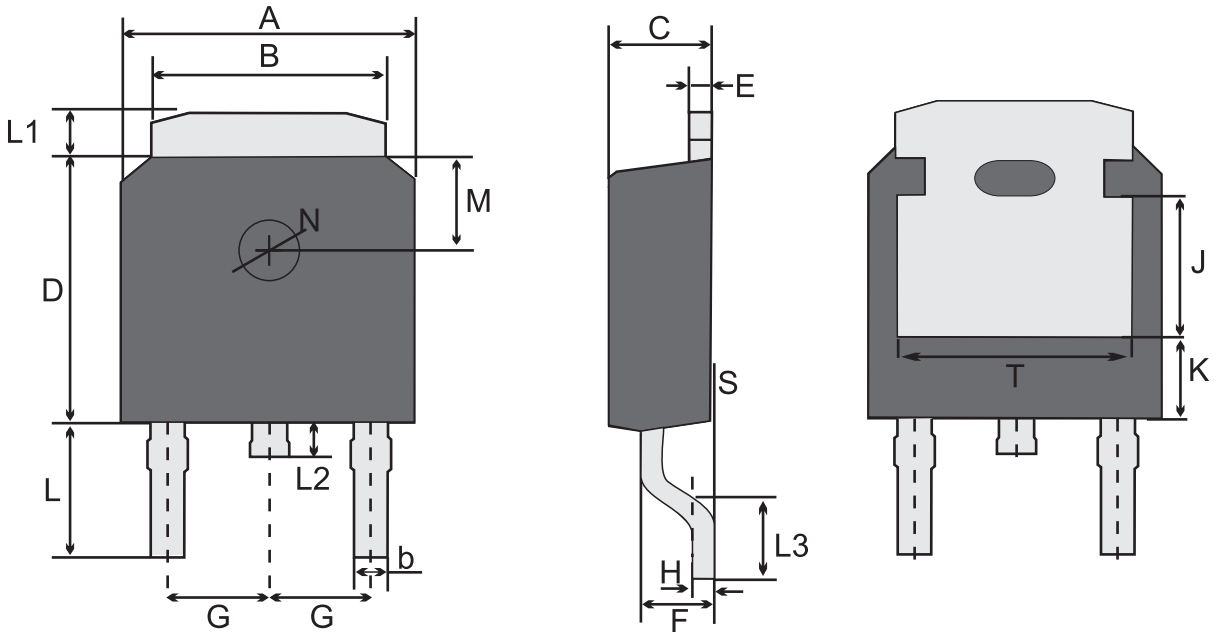


Fig.12 Max. Transient Thermal Impedance



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

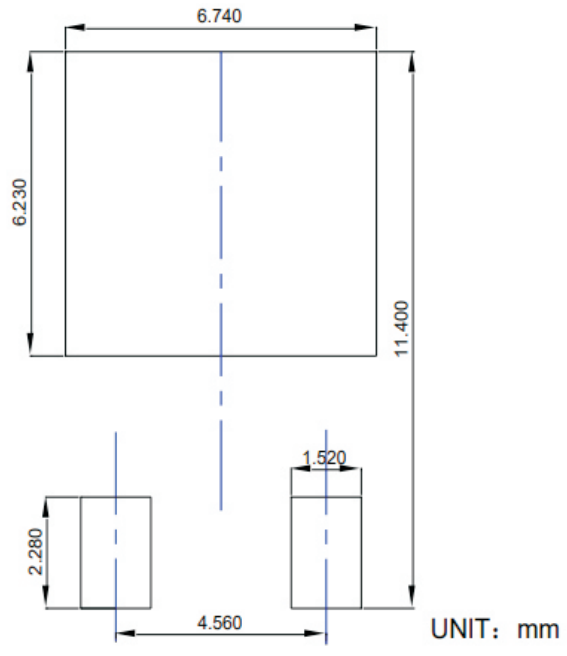


TO-252W(D-PAK)Mechanical data

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	3.1	1.2	1.0	1.90	0.1	1.8 typ.	1.3 typ.	3.2 ref.	5.23 ref.	1.8 ref.
	typ	6.6	5.33	0.76	2.3	6.1	0.51	1.57		0.50	2.95	1.0	0.8	1.45	0.05					
	min	6.3	5.13	0.66	2.1	5.9	0.41	1.27		0.45	2.7	0.8	0.6	1.00	/					
mil	max	264	218	34	98	248	24	74	91 typ.	22	121	47	39	75	3.9	71 typ.	51 typ.	126 ref.	206 ref.	71 ref.
	typ	260	210	30	91	240	20	62		20	116	39	31	57	2					
	min	248	202	26	83	232	16	50		18	106	31	24	39	/					

Marking

Type number	Marking code
D80R830ET	D80R830ET



SUGGESTED SOLDER PAD LAYOUT

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