



15A 100V N-CHANNEL POWER MOSFET

TO-252W(Prefix :D)

Description

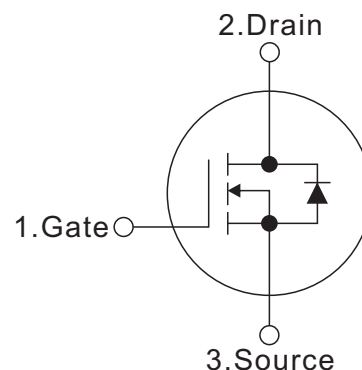
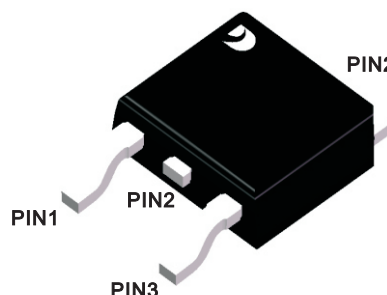
The D70RNS100W uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.

Features

- $R_{DS(on)} < 90 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=10\text{A}$
- Fast switching capability
- 100% Avalanche tested
- 100% ΔV_{DS} tested

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	I_D	15	A
Pulsed Drain Current (Note 2)	I_{DM}	42	A
Avalanche Energy Single Pulsed (Note 3)	E_{AS}	25	mJ
Power Dissipation	P_D	62.5	W
Operation Junction Temperature 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. $L = 0.5\text{mH}, V_G = 10\text{V}, V_{DD} = 50\text{V}, R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$

Thermal Data

Parameter	Symbols	Ratings	Units
Junction to Ambient	R_{thJA}	63	°C/W
Junction to Case	R_{thJC}	2	°C/W

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.



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

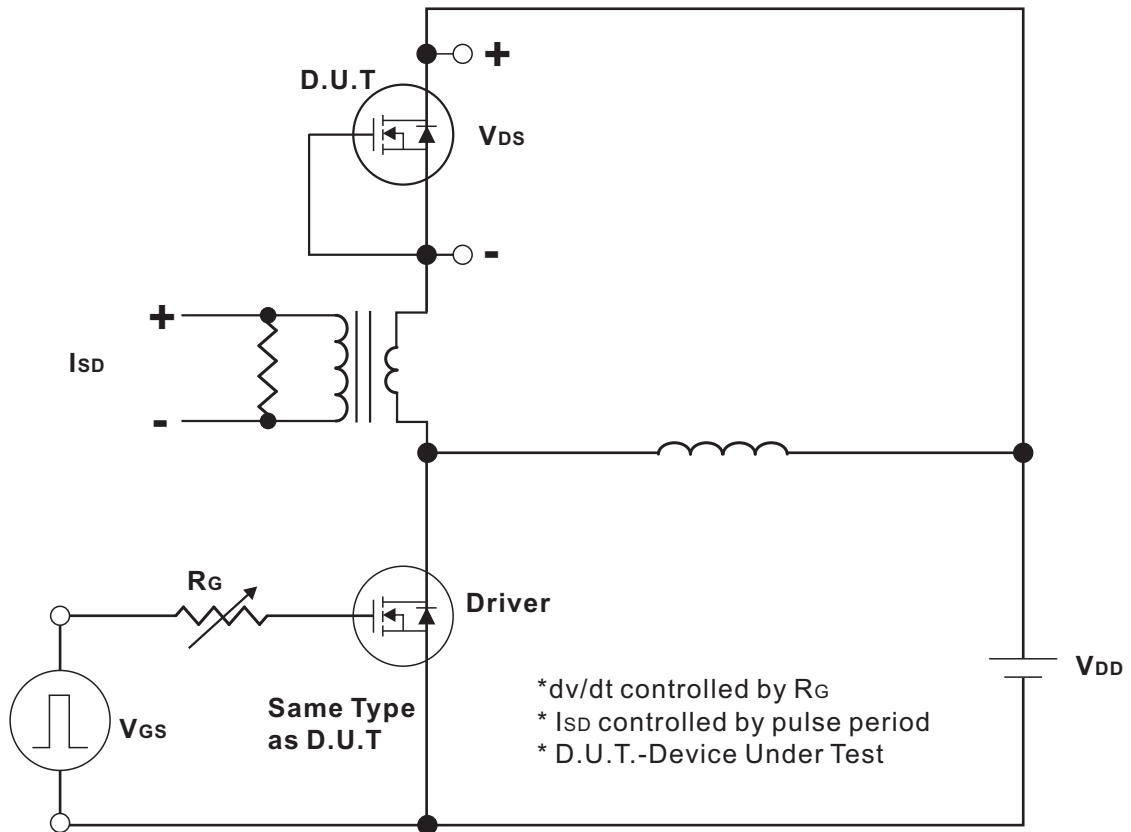
Parameter	Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{DS}=0V, I_D=250\mu A$	100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$ $V_{DS}=100V, V_{GS}=0V$			1 10	μA
Gate- Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse					
On Characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		2.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$ $V_{GS}=4.5V, I_D=10A$		70	90	$m\Omega$
				100	160	$m\Omega$
Dynamic Characteristics						
Input Capacitance	C_{ISS}	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$		236		pF
Output Capacitance	C_{OSS}			132		pF
Reverse Transfer Capacitance	C_{RSS}			11.2		pF
Gate resistance	R_G		$V_{DS}=0V, f=1.0MHz$		5	
Switching Characteristics						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=50V, V_{GS}=10V,$ $I_D=5A$ (NOTE 1,2)		16.3		nC
Gate-Source Charge	Q_{GS}			3.68		nC
Gate-Drain Charge	Q_{GD}			2.97		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=50V, V_{GS}=10V,$ $I_D=5A, R_G=3\Omega$ (NOTE 1,2)		38		ns
Turn-On Rise Time	t_R			25.8		ns
Turn-Off Delay Time	$t_{D(OFF)}$			16		ns
Turn-Off Fall Time	t_F			8.8		ns
Drain-source Diode Characteristics And Maximum Ratings						
Maximum Body-Diode Continuous Current	I_S				15	A
Maximum Body-Diode Pulsed Current	I_{SM}				42	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=5A, V_{GS}=0V$			1.2	V
Reverse Recovery Time (Note 1)	t_{rr}	$I_S=5A, V_{GS}=0V,$ $di/dt=100A/\mu s$		72		ns
Reverse Recovery Charge	Q_{rr}				16	

Notes:

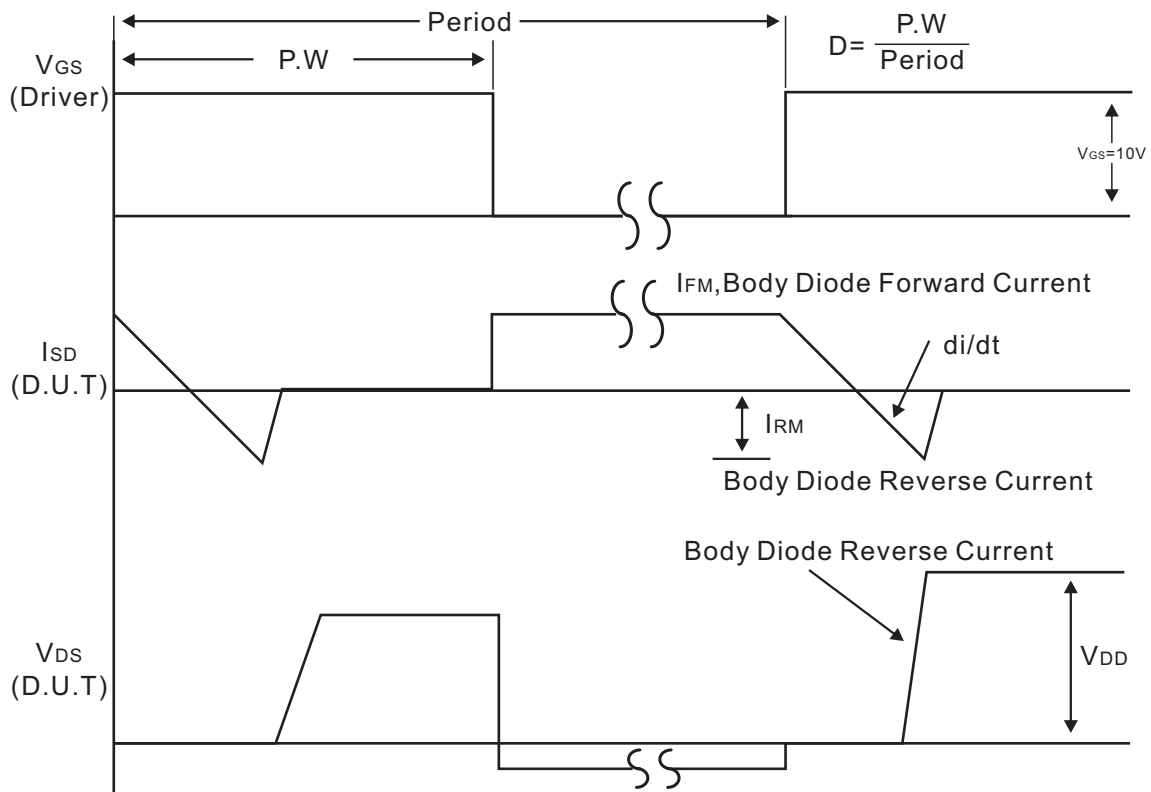
1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature.



Test Circuits and waveforms



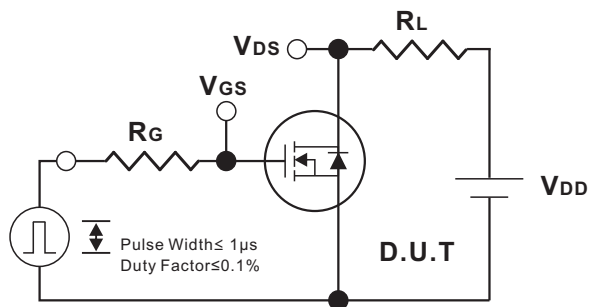
Peak Diode Recovery dv/dt Test Circuit



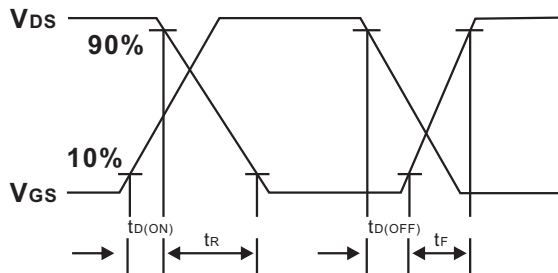
Peak Diode Recovery dv/dt Waveforms



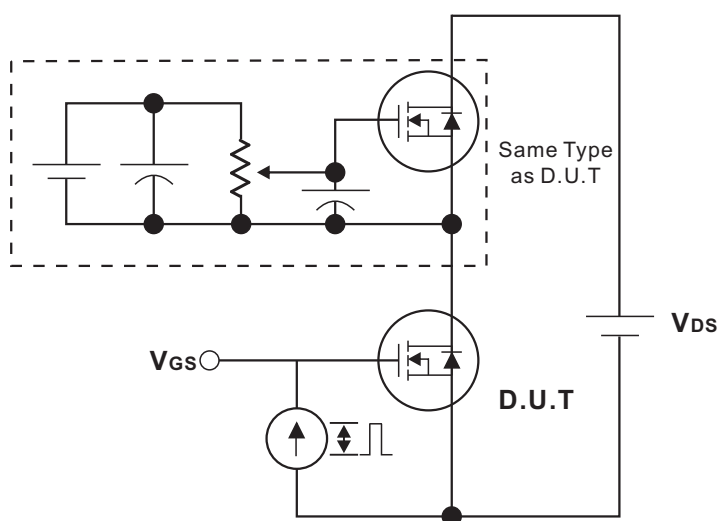
Test Circuits and waveforms



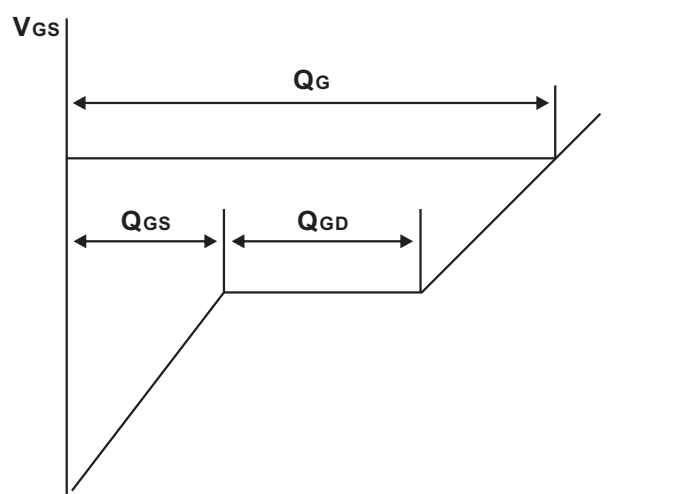
Switching Test Circuit



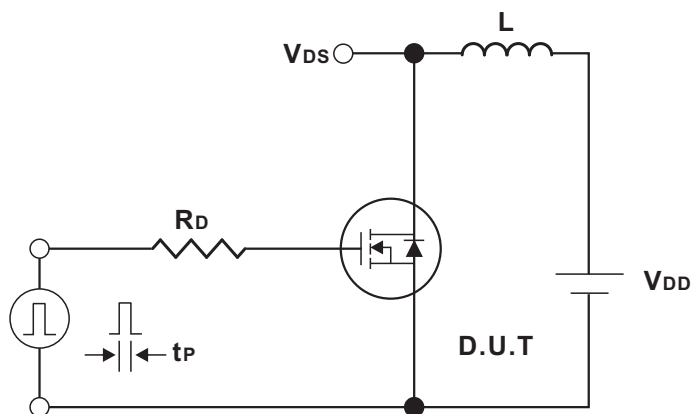
Switching Waveforms



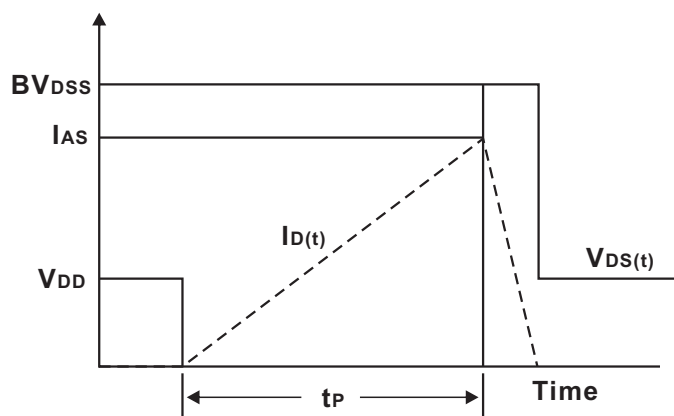
Gate Charge Test Circuit



Charge
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



Typical Characteristics

Fig.1 Typical Output Characteristics

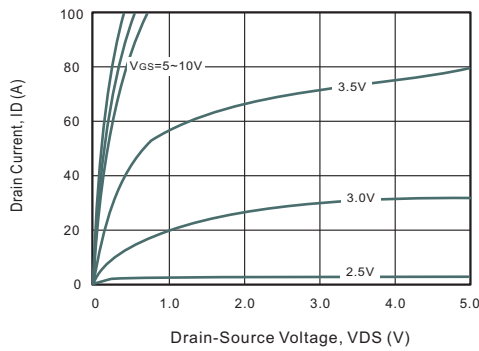


Fig.2 Power Dissipation

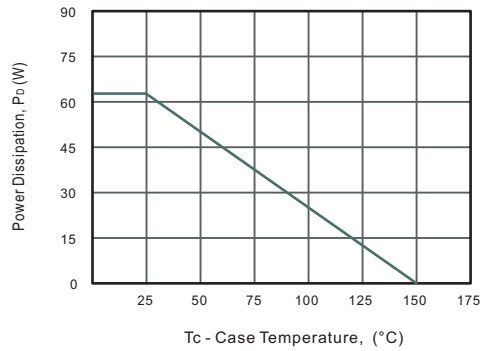


Fig.3 Drain Current Derating

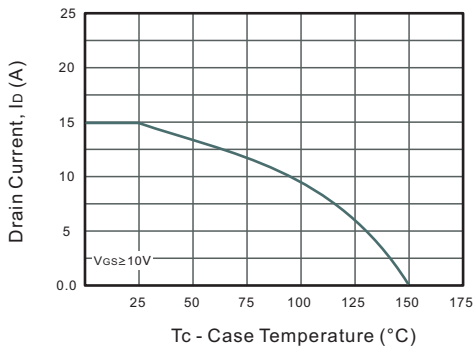


Fig.4 Drain-Source On-Resistance vs. Drain Current

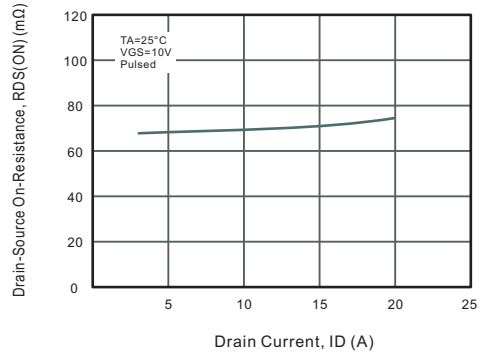


Fig.5 Gate Threshold Voltage vs. Junction Temperature

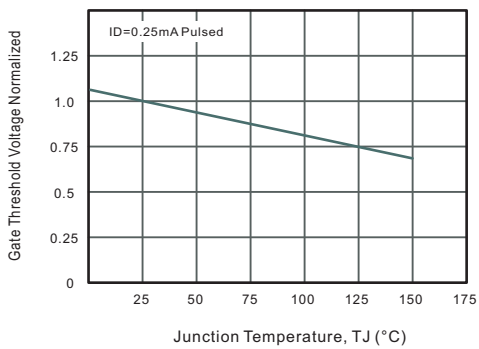


Fig.6 Body-diode Forward Characteristics

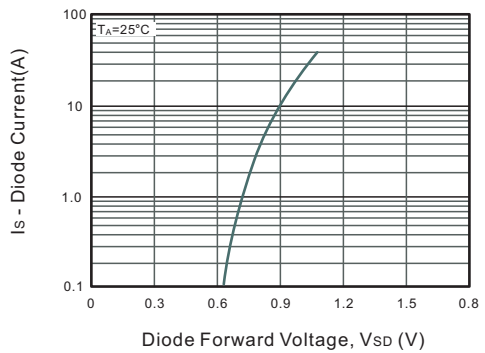


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

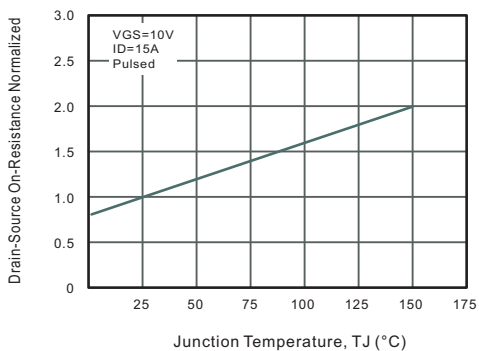
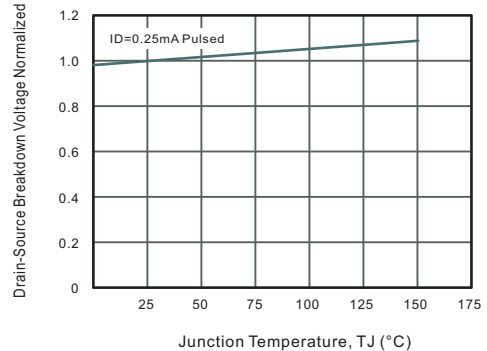


Fig.8 Breakdown Voltage vs. Junction Temperature





Typical Characteristics

Fig.9 Capacitance Characteristics

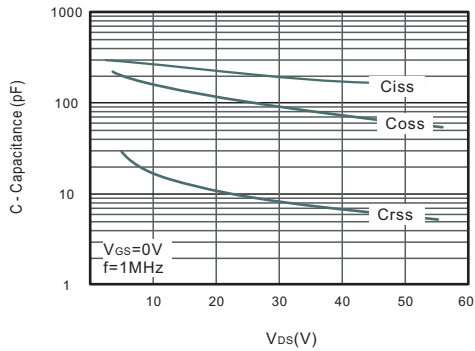


Fig.10 Gate Charge Characteristics

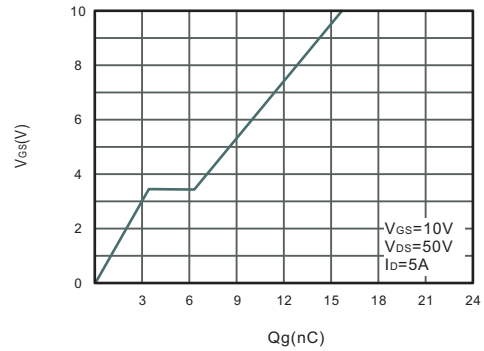


Fig.11 Safe Operating Area

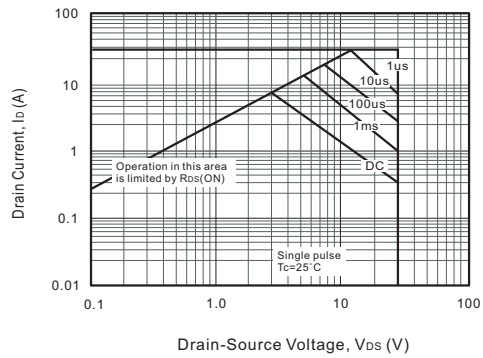
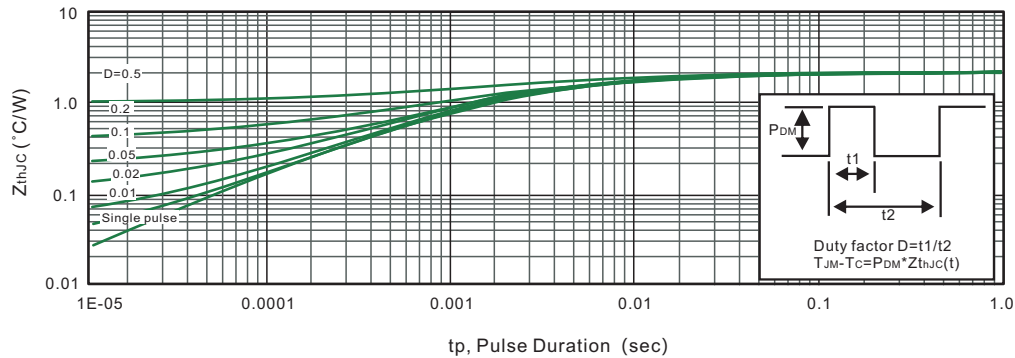
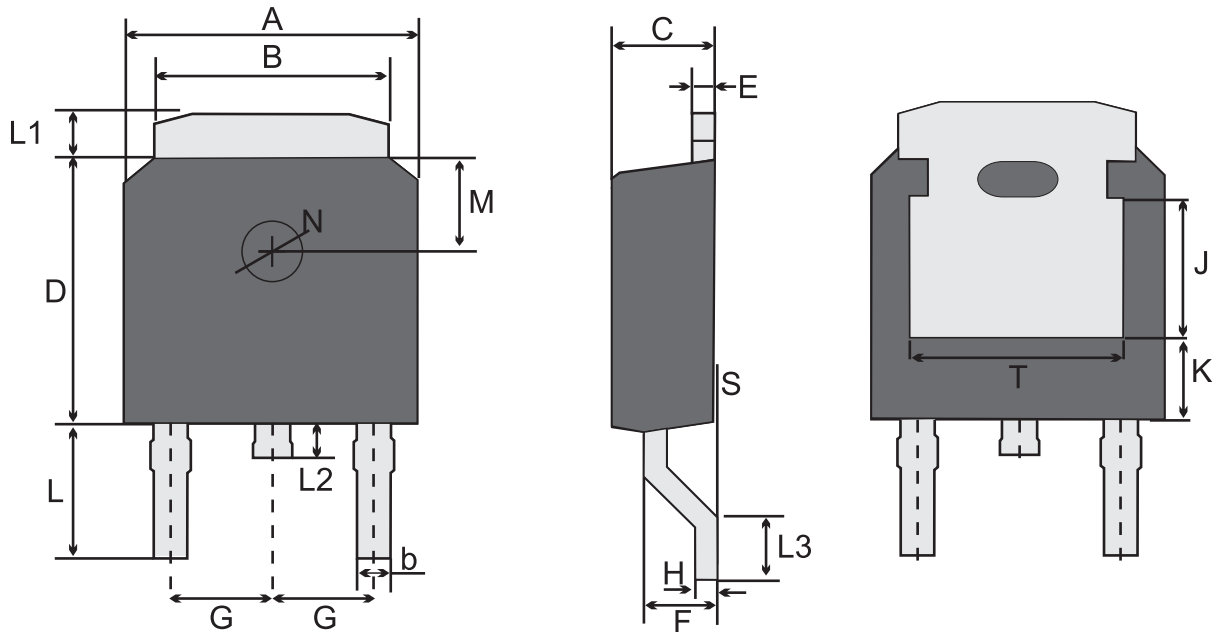


Fig.12 Max. Transient Thermal Impedance





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

Type number	Marking code
D70RN100W	D70RN100W



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