



## 15A 100V N-CHANNEL POWER MOSFET

## TO-252W(Prefix :D)

### Description

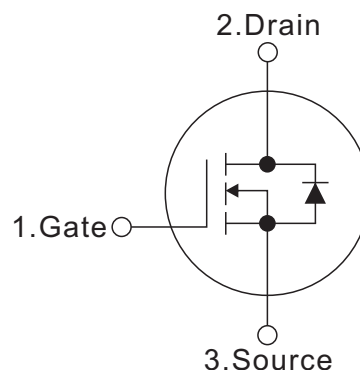
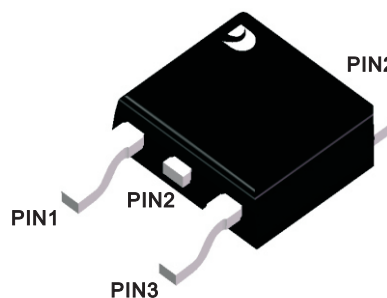
The D70RNS100W uses advanced SGT technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. It can be used in a wide variety of applications.

### Features

- SGT technology
- $R_{DS(ON)} < 90 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=10\text{A}$
- Fast switching capability
- 100% Avalanche tested
- 100%  $\Delta V_{DS}$  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	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	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)

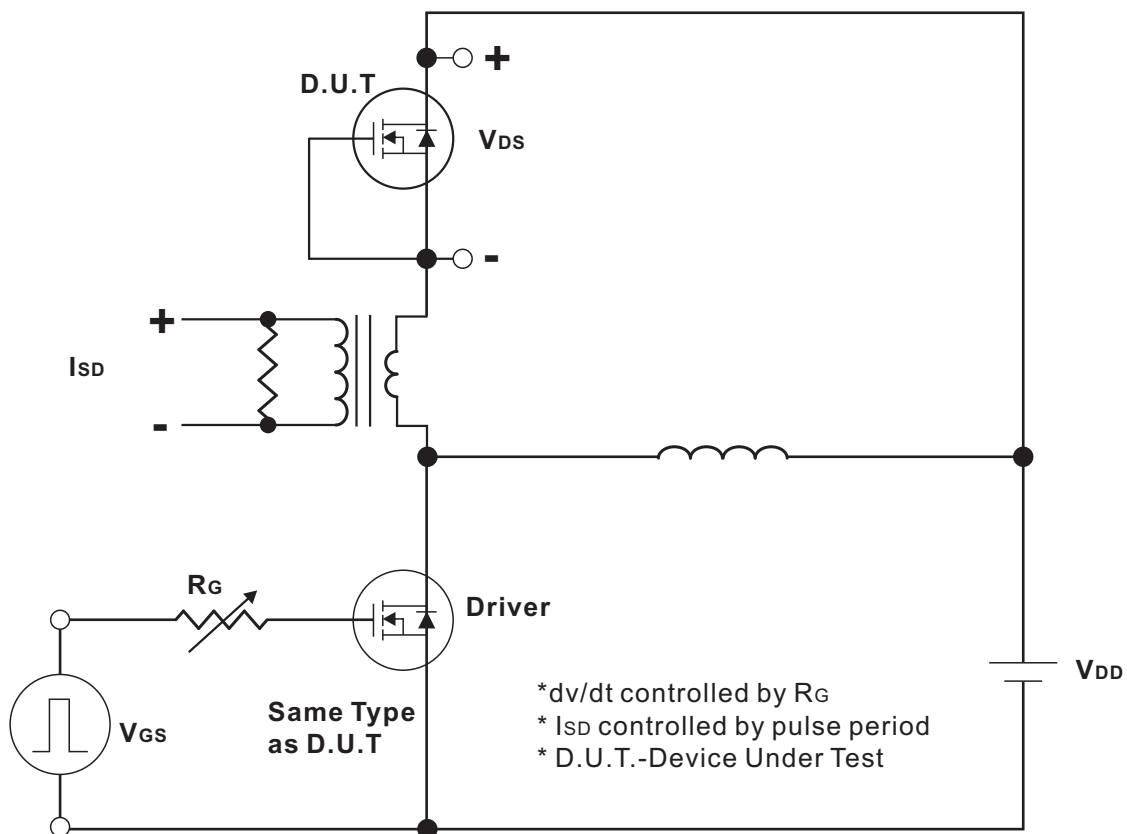
Parameter	Symbols	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=80V, V_{GS}=0V$ $V_{DS}=100V, V_{GS}=0V$			1 10	$\mu A$
Gate- Source Leakage Current	Forward	$I_{GSS}$			100	nA
	Reverse					
<b>On Characteristics</b>						
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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$		70	90	m $\Omega$
<b>Dynamic Characteristics</b>						
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	$R_G$	$V_{GS}=0V, V_{DS}=0V, f=1MHz$		5		$\Omega$
<b>Switching Characteristics</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=50V, V_{GS}=10V,$ $I_D=5A$ (NOTE 1,2)		4.3		nC
Gate-Source Charge	$Q_{GS}$			1.0		nC
Gate-Drain Charge	$Q_{GD}$			0.8		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)		37.5		ns
Turn-On Rise Time	$t_R$			24.5		ns
Turn-Off Delay Time	$t_{D(OFF)}$			15.2		ns
Turn-Off Fall Time	$t_F$			9		ns
<b>Drain-source Diode Characteristics And Maximum Ratings</b>						
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)	$t_{rr}$	$I_F=5A$ $di/dt=100A/\mu s$		72		ns
Reverse Recovery Charge	$Q_{rr}$				16	

Notes:

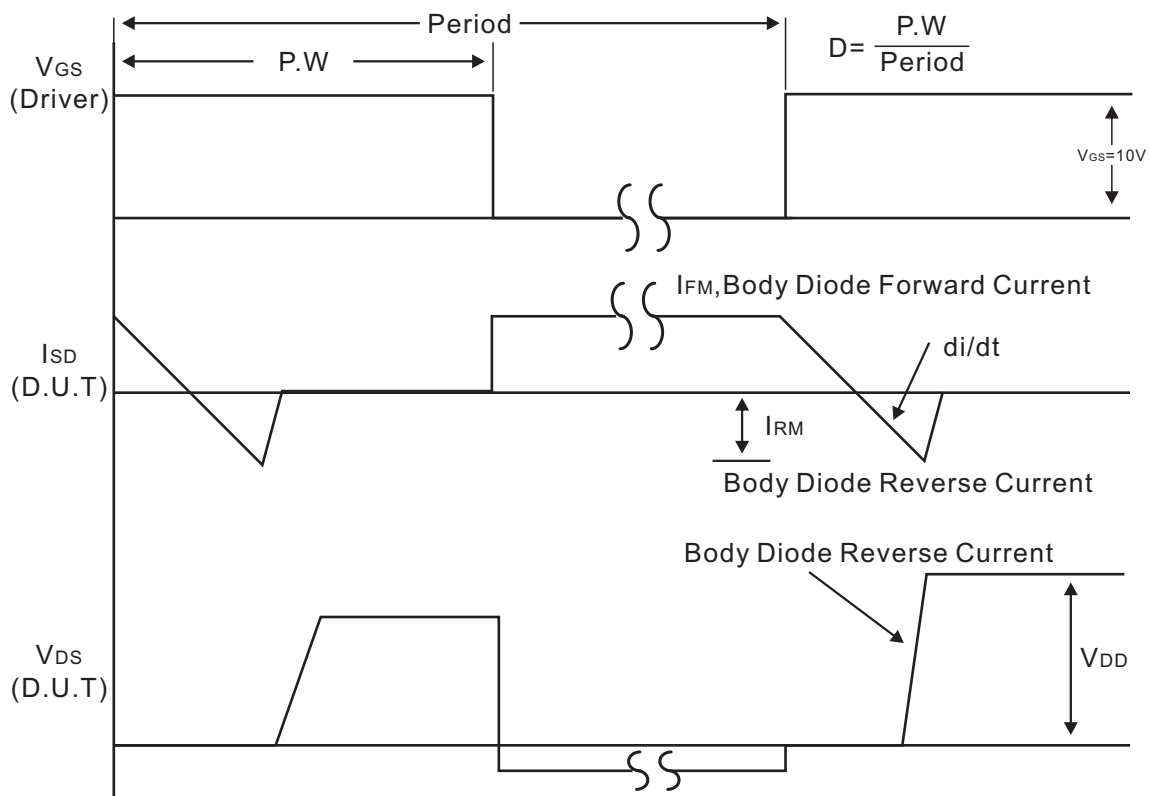
1. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .
2. Essentially independent of operating temperature.



Test Circuits and waveforms



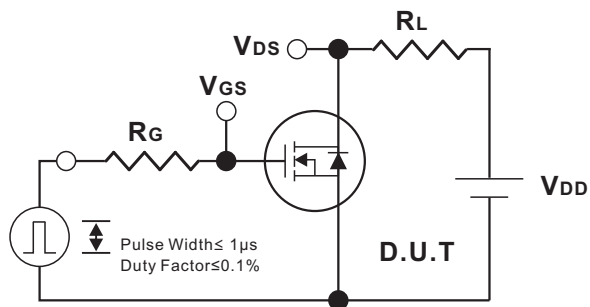
Peak Diode Recovery dv/dt Test Circuit



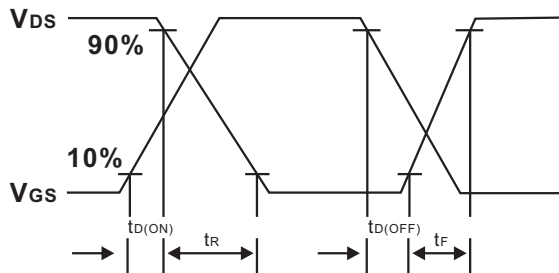
Peak Diode Recovery dv/dt Waveforms



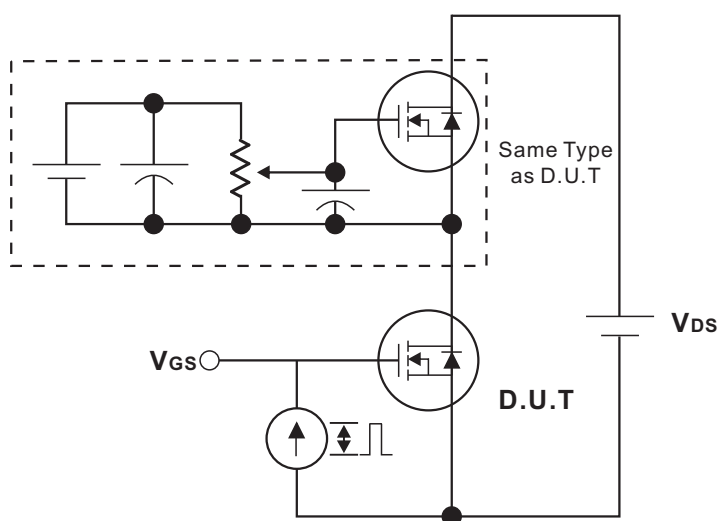
### Test Circuits and waveforms



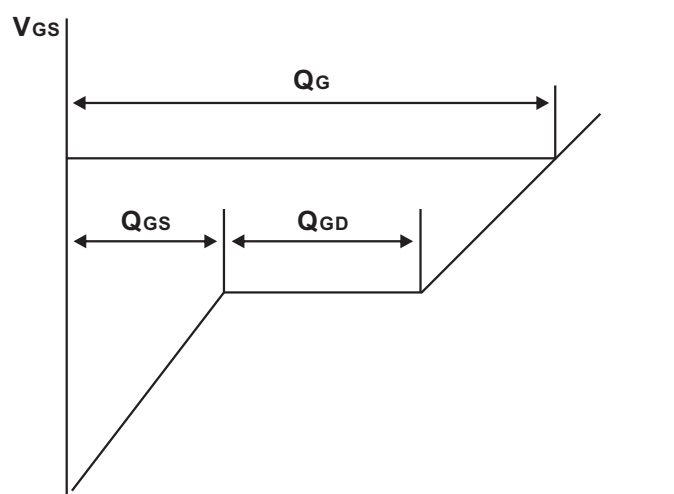
Switching Test Circuit



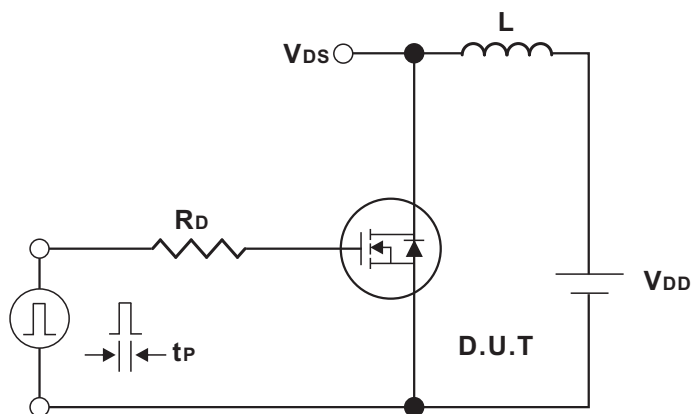
Switching Waveforms



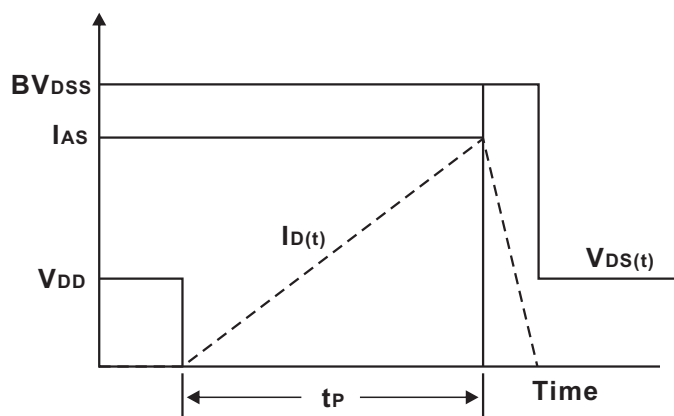
Gate Charge Test Circuit



Charge Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



### Typical Characteristics

Fig.1 Typical Output Characteristics

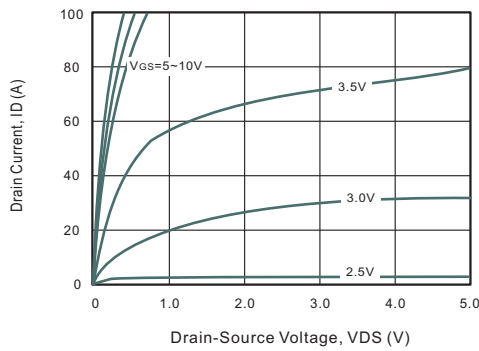


Fig.2 Power Dissipation

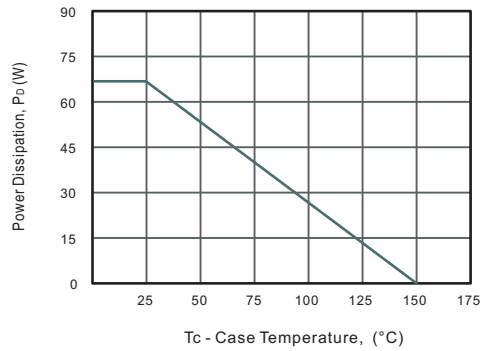


Fig.3 Drain Current Derating

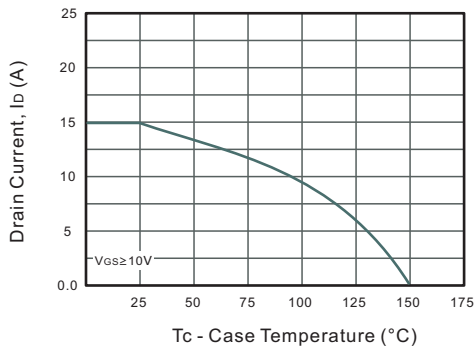


Fig.4 Drain-Source On-Resistance vs. Drain Current

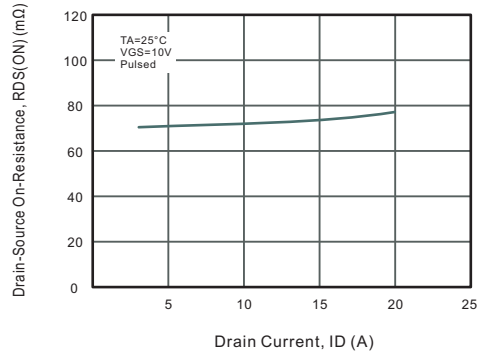


Fig.5 Gate Threshold Voltage vs. Junction Temperature

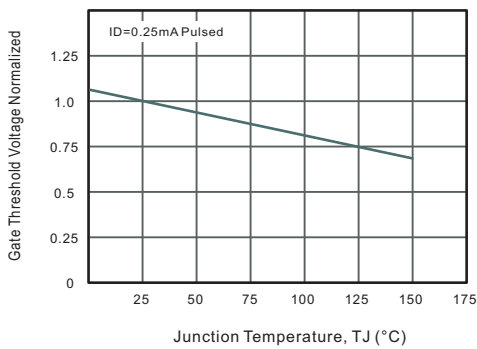


Fig.6 Body-diode Forward Characteristics

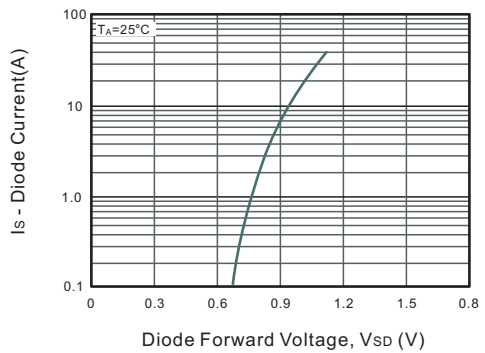


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

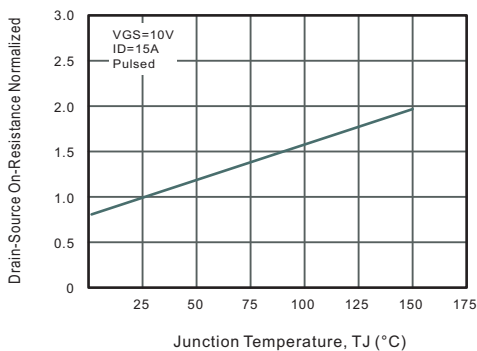
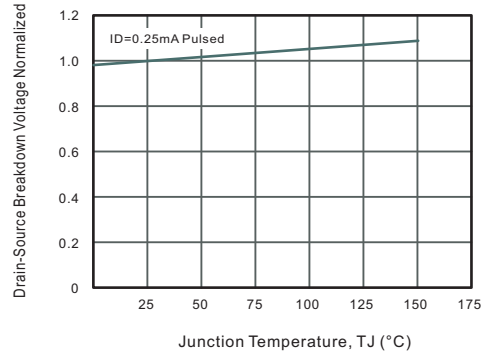


Fig.8 Breakdown Voltage vs. Junction Temperature





### Typical Characteristics

Fig.9 Capacitance Characteristics

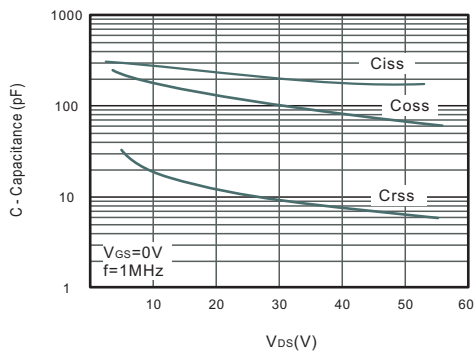


Fig.10 Gate Charge Characteristics

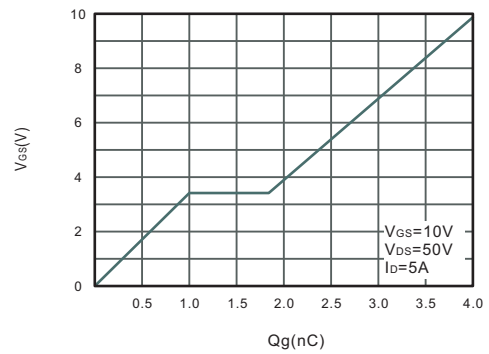


Fig.11 Safe Operating Area

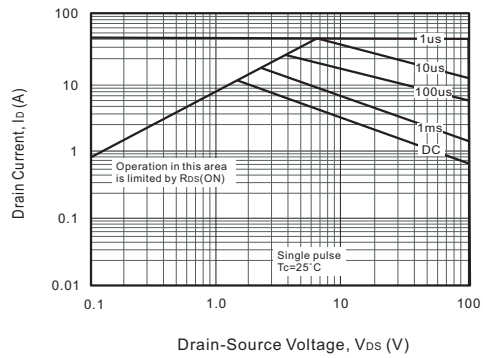
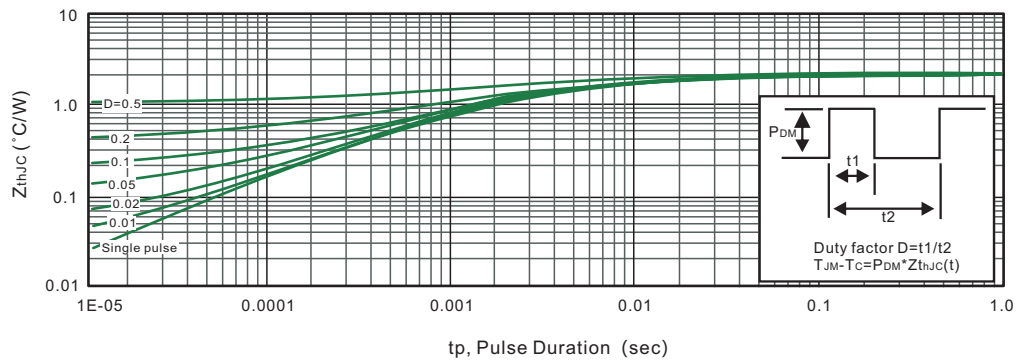
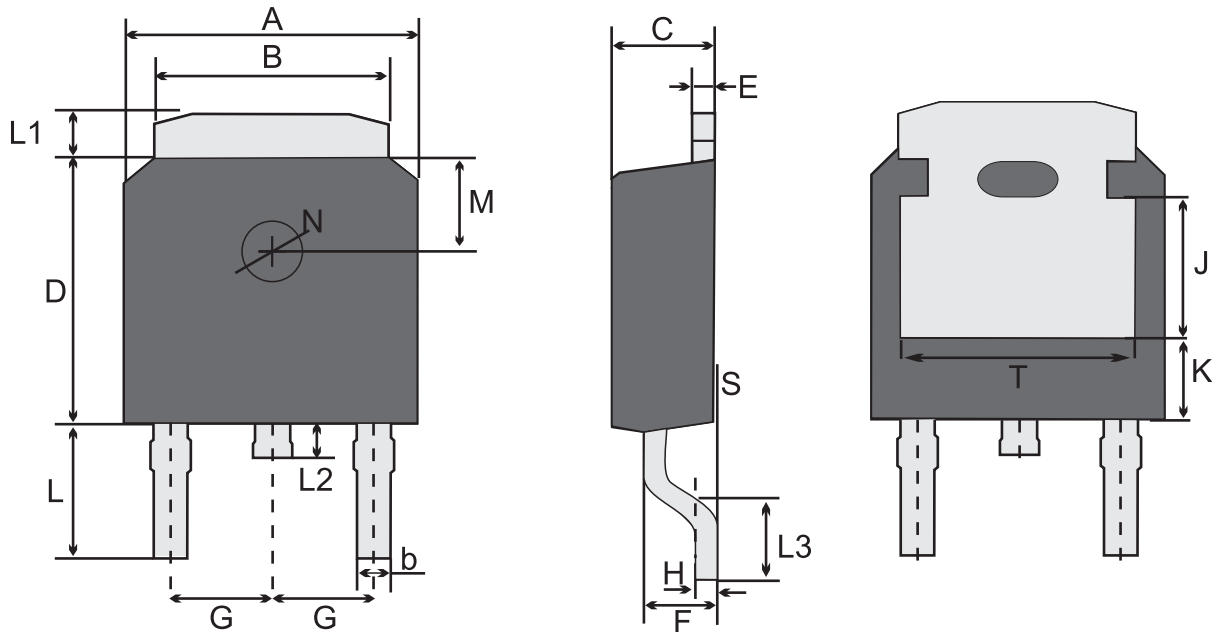


Fig.12 Max. Transient Thermal Impedance





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

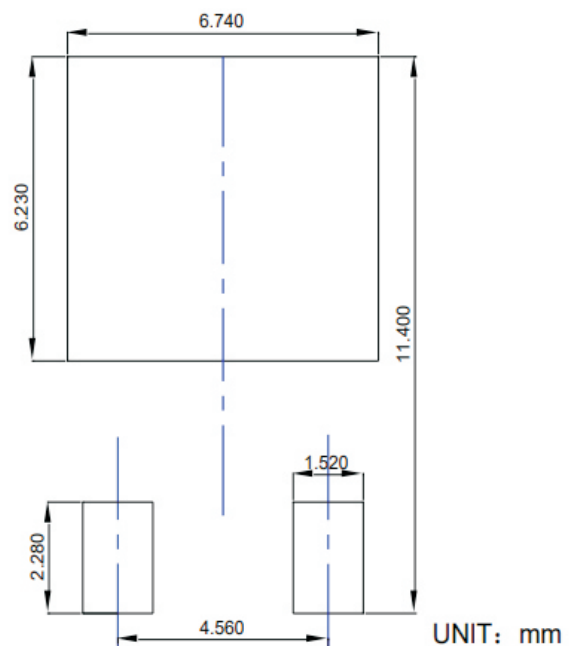


TO-252W(D-PAK) Mechanical data

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	3.1	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
D70RNS100W	D70RNS100W



SUGGESTED SOLDER PAD LAYOUT



Important Notice and Disclaimer

Jingdao Microelectronics reserves the right to make changes to this document and its products and specifications at any without notice.

Customers should obtain and confirm the latest product information and specifications before final, purchase or use.

Jingdao Microelectronics makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, not does Jingdao Microelectronics assume any liability for application assistance or customer product design.

Jingdao Microelectronics does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of Jingdao Microelectronics.

Jingdao Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of Jingdao Microelectronics.