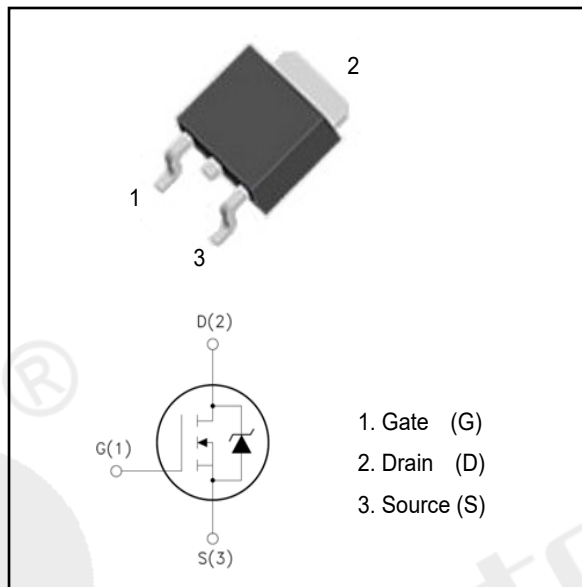




**Features:**

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 14nC (Typ.).
- BVDSS=100V, I<sub>D</sub>=10A
- R<sub>DS(on)</sub> : 0.21Ω (Max) @V<sub>G</sub>=10V
- 100% Avalanche Tested

TO-252



**Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous	I <sub>D</sub>	10.0	A
Drain Current-Pulsed <sup>(Note 1)</sup>	I <sub>DM</sub>	24	A
Maximum Power Dissipation	P <sub>D</sub>	3	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 To 150	°C

**Thermal Characteristic**

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	R <sub>θJA</sub>	41.7	°C/W
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**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	100	105	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V	-	-	800	nA



Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 30$	$\mu A$
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$	-	190	210	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=2.9A$	-	8	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$	-	690	-	PF
Output Capacitance	$C_{oss}$		-	120	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	90	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$	-	11	-	nS
Turn-on Rise Time	$t_r$		-	7.4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35	-	nS
Turn-Off Fall Time	$t_f$		-	9.1	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=30V, I_D=10A,$ $V_{GS}=10V$	-	14.0	-	nC
Gate-Source Charge	$Q_{gs}$		-	3.2	-	nC
Gate-Drain Charge	$Q_{gd}$		-	4.7	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=6A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	5.0	A

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

### Typical Characteristics

Figure1. Source-Drain Diode Forward Voltage

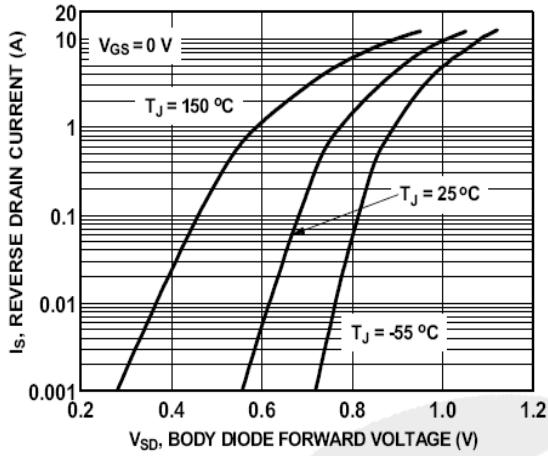


Figure2. Safe operating area

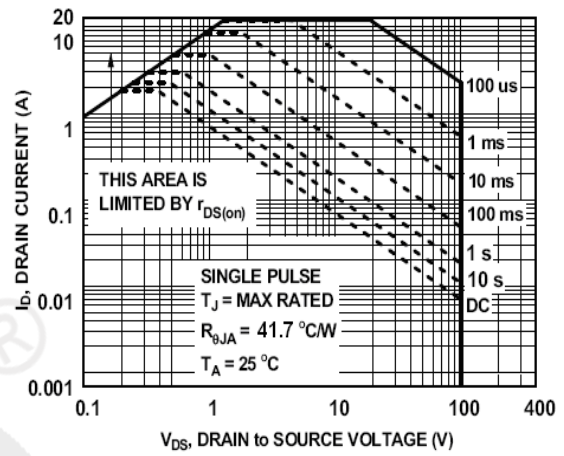


Figure3. Output characteristics

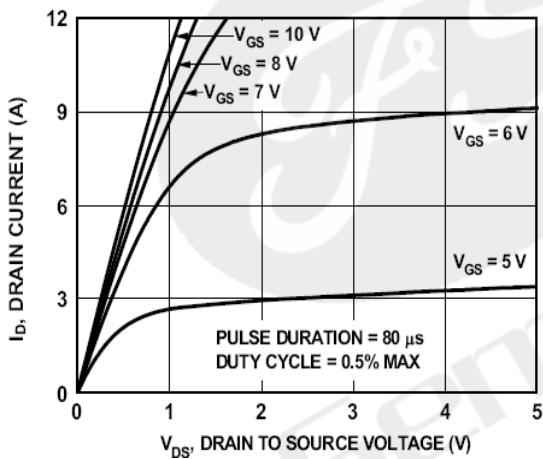


Figure4. Transfer characteristics

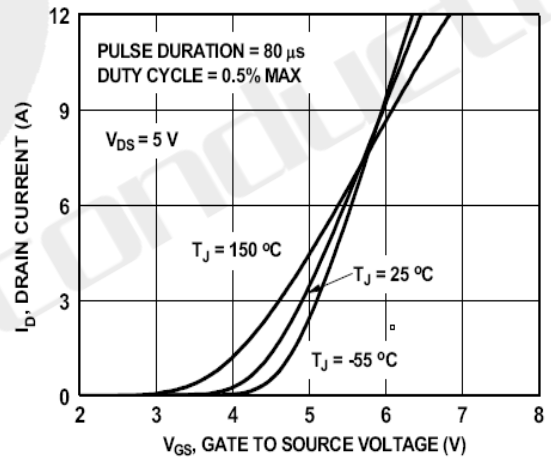


Figure5. Static drain-source on resistance

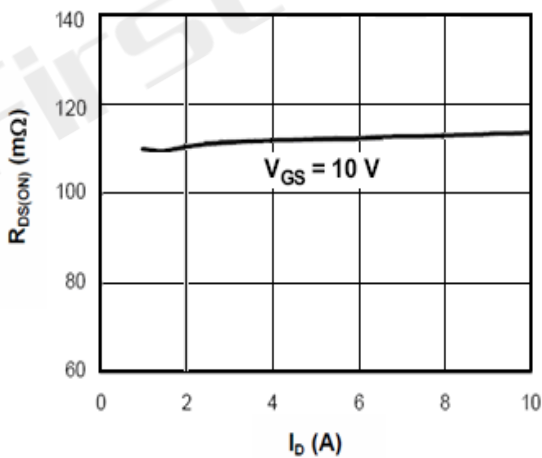
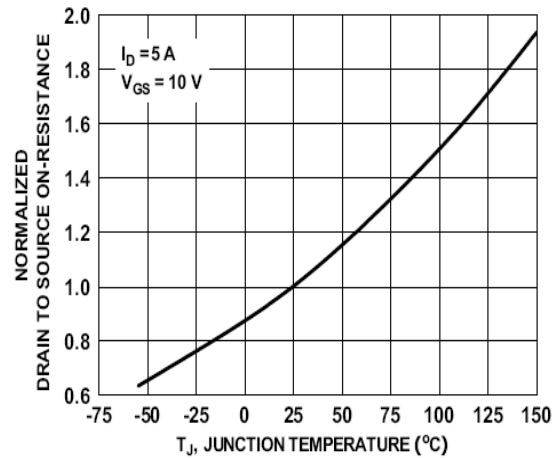


Figure6.  $R_{DS(ON)}$  vs Junction Temperature



Typical Characteristics (Continued)

Figure7.  $BV_{DSS}$  vs Junction Temperature

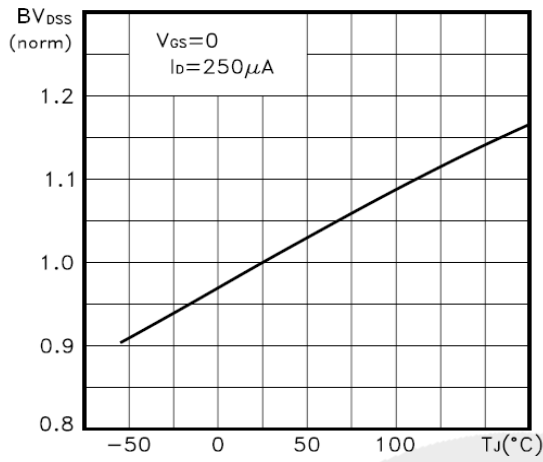


Figure8.  $V_{GS(th)}$  vs Junction Temperature

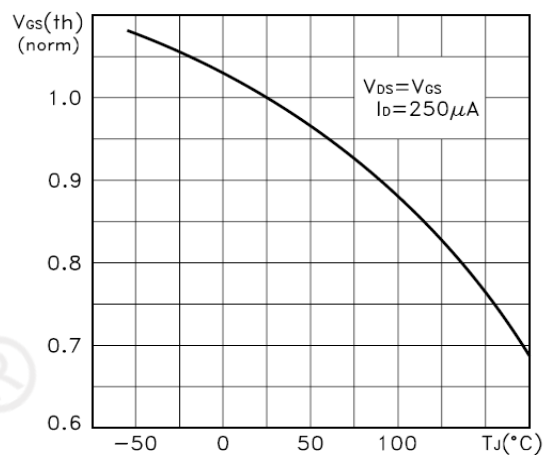


Figure9. Gate charge waveforms

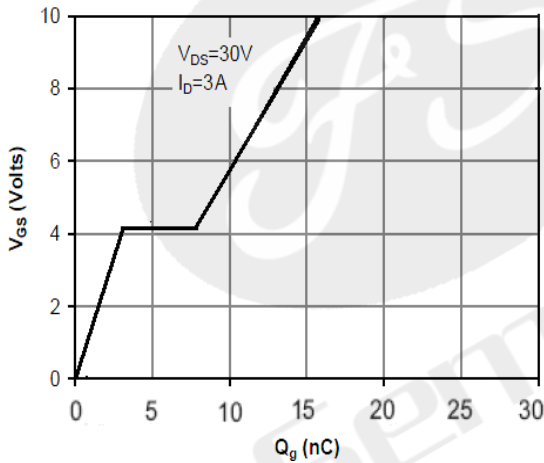


Figure10. Capacitance

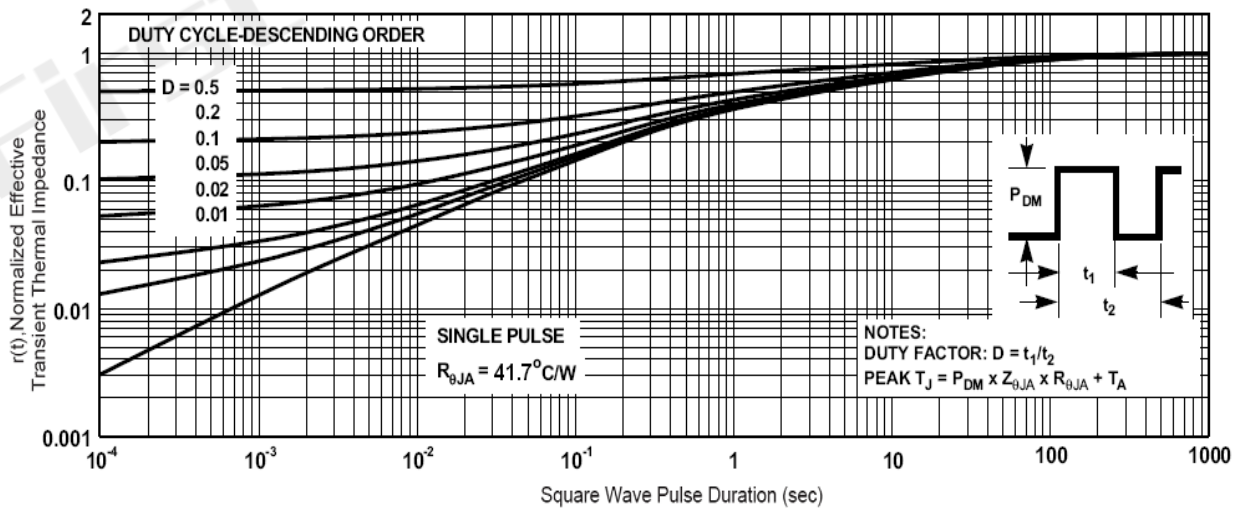
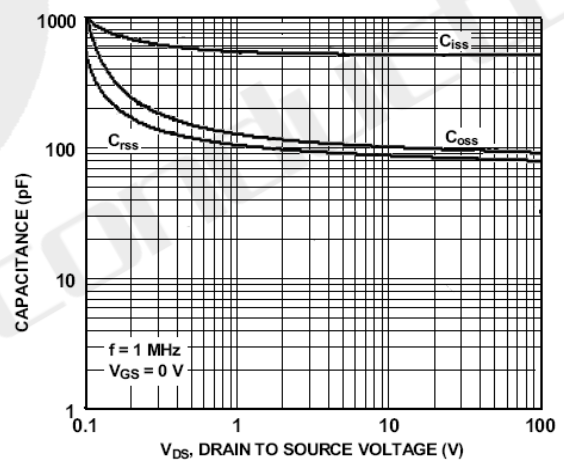
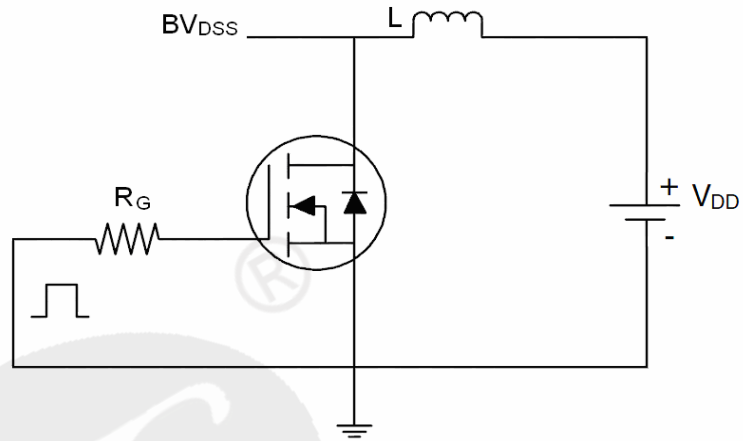


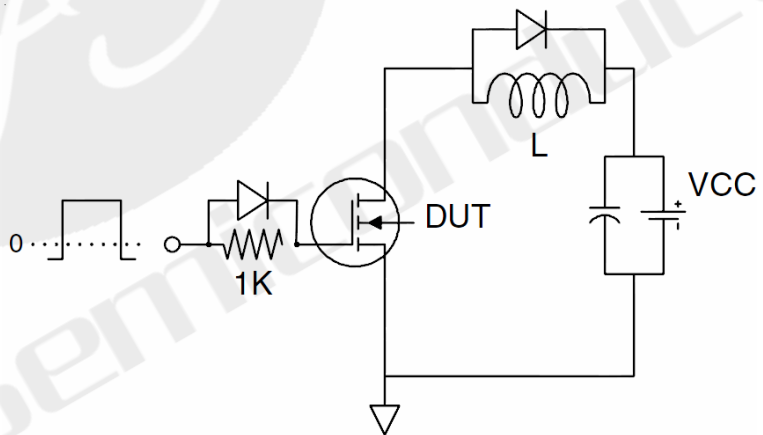
Figure11. Normalized Maximum Transient Thermal Impedance

**Test Circuit**

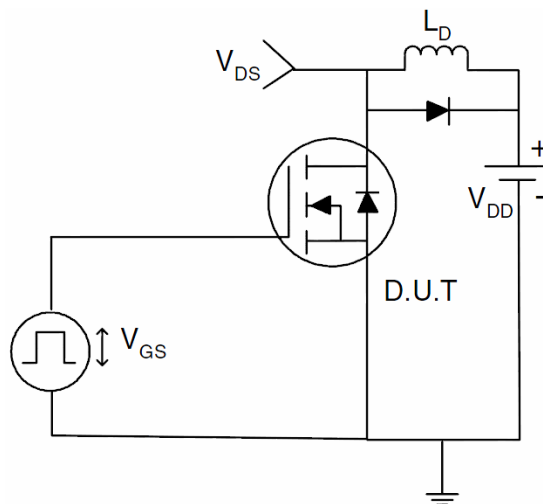
**1)  $E_{AS}$  test Circuit**



**2) Gate charge test Circuit**

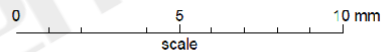
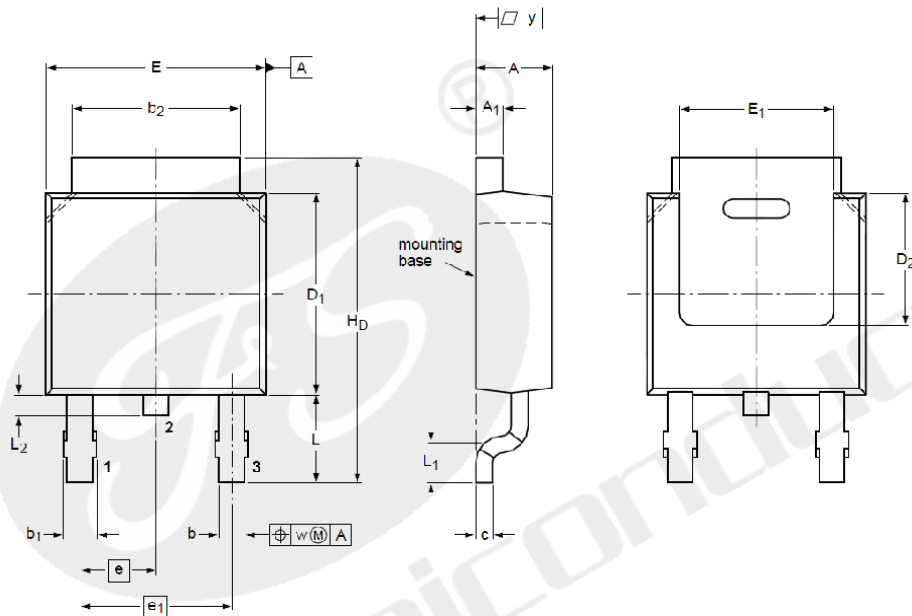


**3) Switch Time Test Circuit**



Package Dimension

TO-252



DIMENSIONS ( unit : mm )

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	2.22	2.30	2.38	A <sub>1</sub>	0.46	0.58	0.93
b	0.71	0.79	0.89	b <sub>1</sub>	0.90	0.98	1.10
b <sub>2</sub>	5.00	5.30	5.46	c	0.20	0.40	0.56
D <sub>1</sub>	5.98	6.05	6.22	D <sub>2</sub>	--	4.00	--
E	6.47	6.60	6.73	E <sub>1</sub>	5.10	5.28	5.45
e	--	2.28	--	e <sub>1</sub>	--	4.57	--
H <sub>D</sub>	9.60	10.08	10.40	L	2.75	2.95	3.05
L <sub>1</sub>	--	0.50	--	L <sub>2</sub>	0.80	0.90	1.10
w	--	0.20	--	y	0.20	--	--



Declaration

- FIRST reserves the right to change the specifications, the same specifications of products due to different packaging line mold, the size of the appearance will be slightly different, shipped in kind, without notice! Customers should obtain the latest version information before ordering, and verify whether the relevant information is complete and up-to-date.
- Any semiconductor product under certain conditions has the possibility of failure or failure, The buyer has the responsibility to comply with safety standards and take safety measures when using FIRST products for system design and manufacturing, To avoid To avoid potential failure risks, which may cause personal injury or property damage!
- Product promotion endless, our company will wholeheartedly provide customers with better products!

**ATTACHMENT**

Revision History

Date	REV	Description	Page
2019.01.01	1.0	Initial release	