

**FEATURES**

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower Leakage Current : 10  $\mu$ A (Max.) @  $V_{DS} = 100V$
- Lower  $R_{DS(ON)}$  : 0.176  $\Omega$  (Typ.)

$$BV_{DSS} = 100 V$$

$$R_{DS(on)} = 0.22 \Omega$$

$$I_D = 2.3 A$$

**SOT-223**



1. Gate 2. Drain 3. Source

**Absolute Maximum Ratings**

Symbol	Characteristic	Value	Units
$V_{DSS}$	Drain-to-Source Voltage	100	V
$I_D$	Continuous Drain Current ( $T_C=25^\circ C$ )	2.3	A
	Continuous Drain Current ( $T_C=70^\circ C$ )	1.85	
$I_{DM}$	Drain Current-Pulsed (1)	18	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulsed Avalanche Energy (2)	105	mJ
$I_{AR}$	Avalanche Current (1)	2.3	A
$E_{AR}$	Repetitive Avalanche Energy (1)	0.27	mJ
dv/dt	Peak Diode Recovery dv/dt (3)	6.5	V/ns
$P_D$	Total Power Dissipation ( $T_C=25^\circ C$ ) *	2.7	W
	Linear Derating Factor *	0.022	W/ $^\circ C$
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	- 55 to +150	$^\circ C$
$T_L$	Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5-seconds	300	

**Thermal Resistance**

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient *	--	46.3	$^\circ C/W$

\* When mounted on the minimum pad size recommended (PCB Mount).

### Electrical Characteristics ( $T_C=25\text{ }^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
$BV_{DSS}$	Drain-Source Breakdown Voltage	100	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta BV/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	0.09	--	V/ $^\circ\text{C}$	$I_D=250\mu A$ <b>See Fig 7</b>
$V_{GS(th)}$	Gate Threshold Voltage	1.0	--	2.0	V	$V_{DS}=5V, I_D=250\mu A$
$I_{GSS}$	Gate-Source Leakage , Forward	--	--	100	nA	$V_{GS}=20V$
	Gate-Source Leakage , Reverse	--	--	-100		$V_{GS}=-20V$
$I_{DSS}$	Drain-to-Source Leakage Current	--	--	10	$\mu A$	$V_{DS}=100V$
		--	--	100		$V_{DS}=80V, T_C=125\text{ }^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-State Resistance	--	--	0.22	$\Omega$	$V_{GS}=5V, I_D=1.15A$ (4)
$g_{fs}$	Forward Transconductance	--	4.6	--	$\bar{U}$	$V_{DS}=40V, I_D=1.15A$ (4)
$C_{iss}$	Input Capacitance	--	340	440	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$ <b>See Fig 5</b>
$C_{oss}$	Output Capacitance	--	90	115		
$C_{rss}$	Reverse Transfer Capacitance	--	39	50		
$t_{d(on)}$	Turn-On Delay Time	--	5	20	ns	$V_{DD}=50V, I_D=9.2A,$ $R_G=9\ \Omega$ <b>See Fig 13</b> (4)(5)
$t_r$	Rise Time	--	10	30		
$t_{d(off)}$	Turn-Off Delay Time	--	19	50		
$t_f$	Fall Time	--	9	30		
$Q_g$	Total Gate Charge	--	10.2	15	nC	$V_{DS}=80V, V_{GS}=5V,$ $I_D=9.2A$ <b>See Fig 6 &amp; Fig 12</b> (4)(5)
$Q_{gs}$	Gate-Source Charge	--	1.7	--		
$Q_{gd}$	Gate-Drain ("Miller") Charge	--	6.0	--		

### Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
$I_S$	Continuous Source Current	--	--	2.3	A	Integral reverse pn-diode in the MOSFET
$I_{SM}$	Pulsed-Source Current (1)	--	--	18		
$V_{SD}$	Diode Forward Voltage (4)	--	--	1.5	V	$T_J=25\text{ }^\circ\text{C}, I_S=2.3A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	--	98	--	ns	$T_J=25\text{ }^\circ\text{C}, I_F=9.2A$
$Q_{rr}$	Reverse Recovery Charge	--	0.34	--	$\mu C$	$di_F/dt=100A/\mu s$ (4)

#### Notes ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ②  $L=30\text{mH}, I_{AS}=2.3A, V_{DD}=25V, R_G=27\Omega,$  Starting  $T_J=25\text{ }^\circ\text{C}$
- ③  $I_{SD} \leq 9.2A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS},$  Starting  $T_J=25\text{ }^\circ\text{C}$
- ④ Pulse Test : Pulse Width =  $250\mu s,$  Duty Cycle  $\leq 2\%$
- ⑤ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

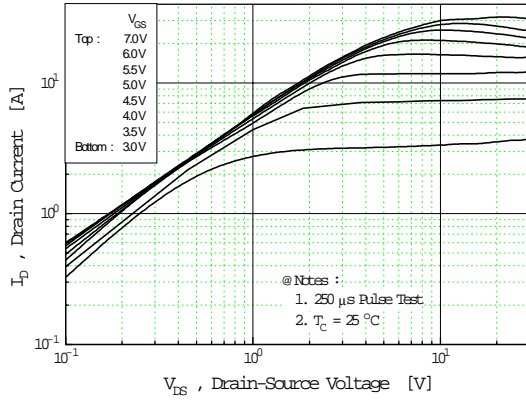


Fig 2. Transfer Characteristics

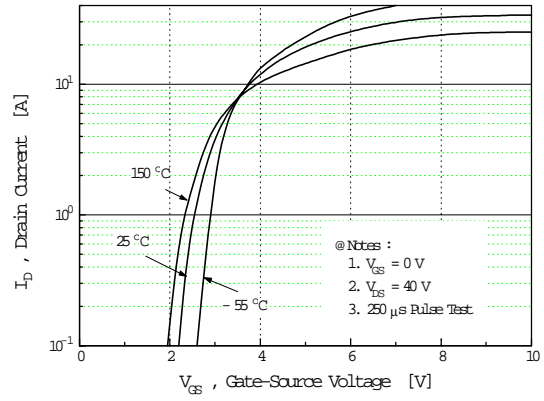


Fig 3. On-Resistance vs. Drain Current

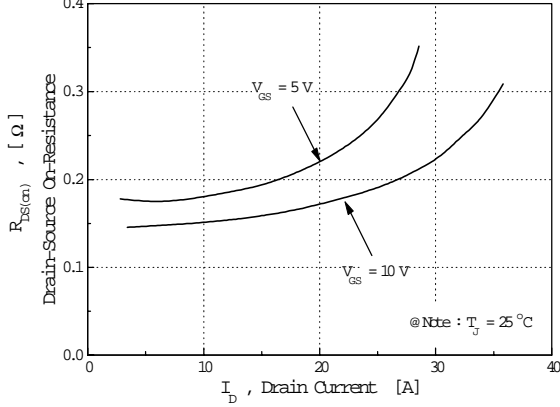


Fig 4. Source-Drain Diode Forward Voltage

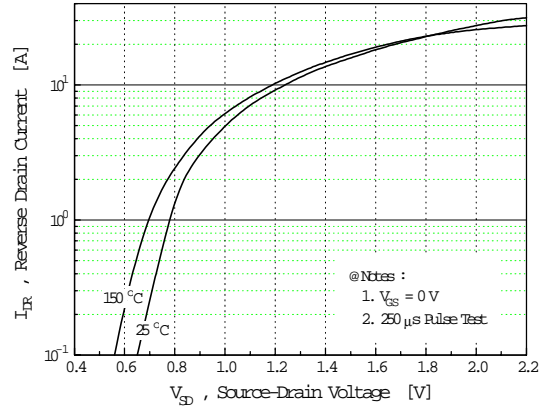


Fig 5. Capacitance vs. Drain-Source Voltage

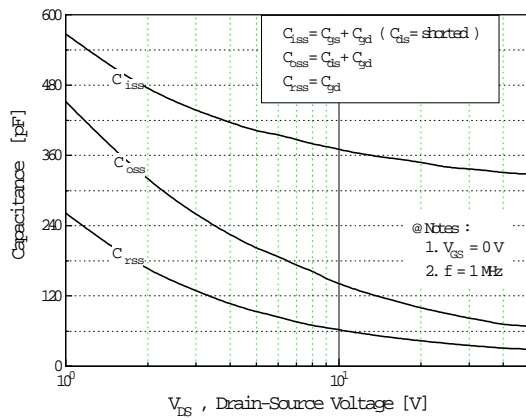
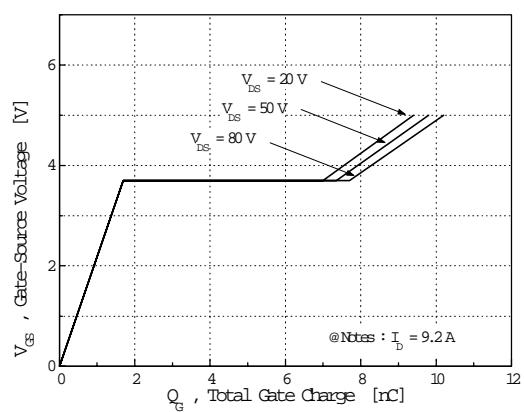
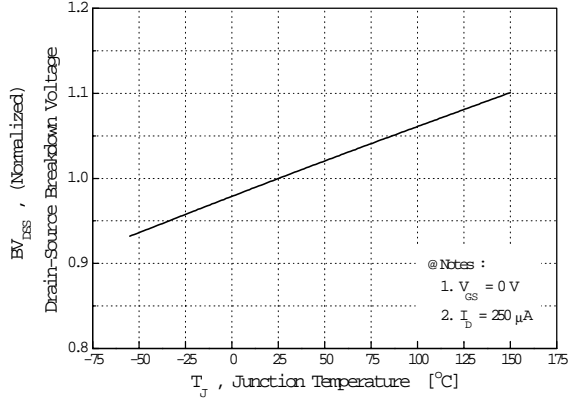


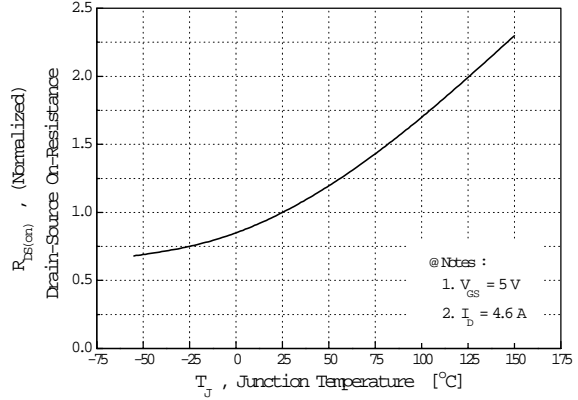
Fig 6. Gate Charge vs. Gate-Source Voltage



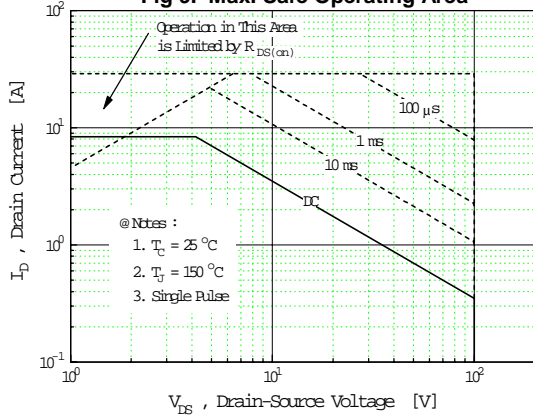
**Fig 7. Breakdown Voltage vs. Temperature**



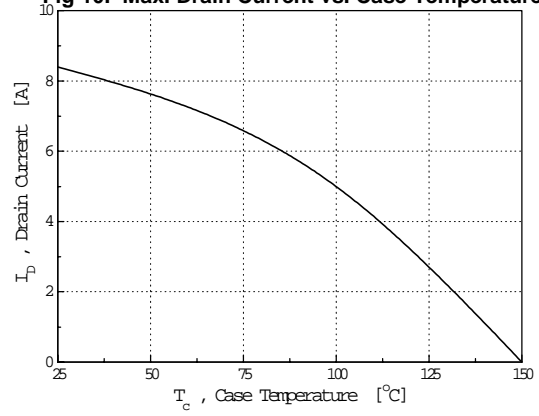
**Fig 8. On-Resistance vs. Temperature**



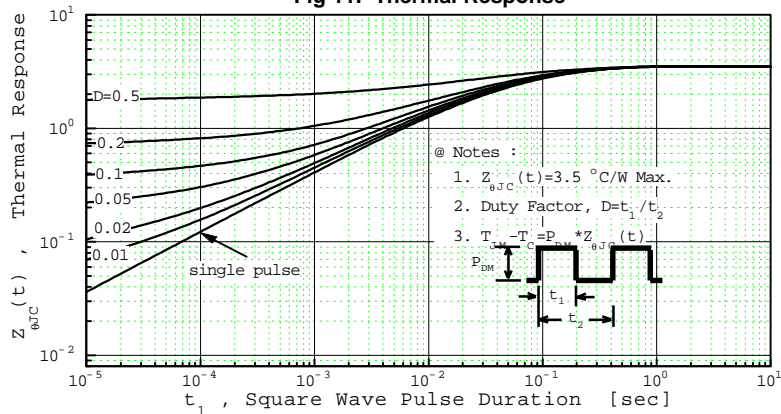
**Fig 9. Max. Safe Operating Area**



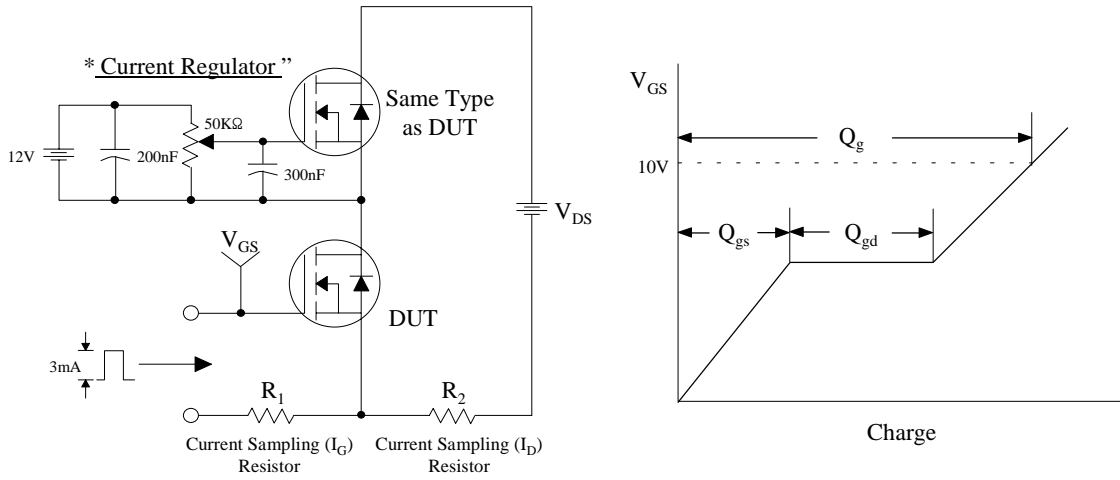
**Fig 10. Max. Drain Current vs. Case Temperature**



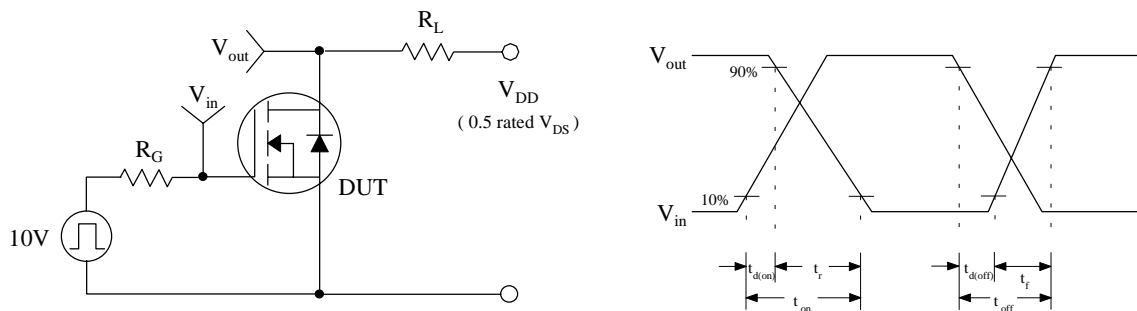
**Fig 11. Thermal Response**



**Fig 12. Gate Charge Test Circuit & Waveform**



**Fig 13. Resistive Switching Test Circuit & Waveforms**



**Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms**

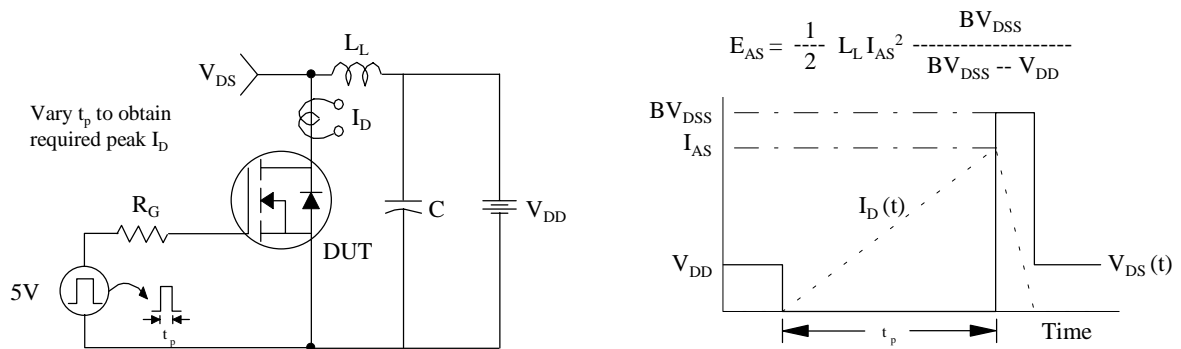
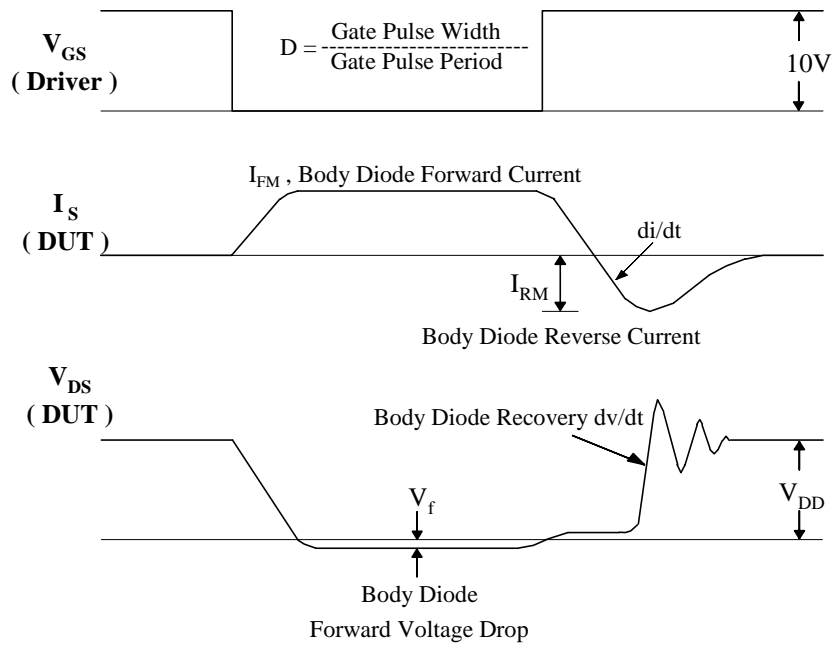
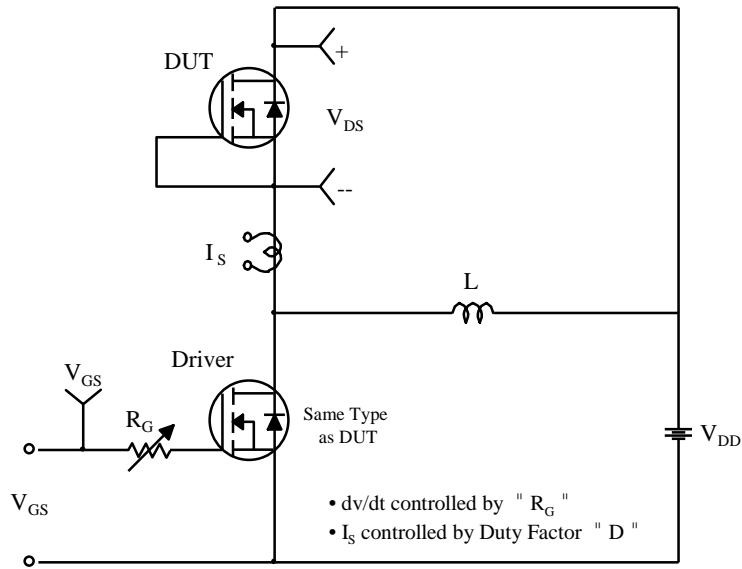


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



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