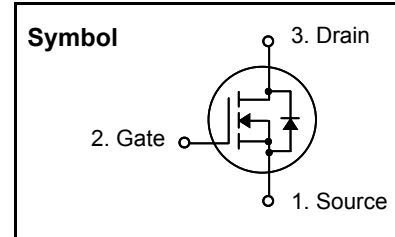


## Logic N-Channel MOSFET

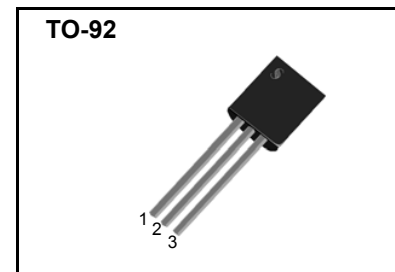
### Features

- $R_{DS(on)}$  (Max 5  $\Omega$ )@ $V_{GS}=10V$   
 $R_{DS(on)}$  (Max 5.3 $\Omega$ )@ $V_{GS}=4.5V$
- Gate Charge (Typical 0.5nC)
- Maximum Junction Temperature Range (150°C)



### General Description

This Power MOSFET is produced using planar DMOS technology. And this Power MOSFET is well suited for Battery switch, Load switch, Motor controller and other small signal switches.



### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain to Source Voltage	60	V
$I_D$	Continuous Drain Current(@ $T_A = 25^\circ C$ )	200	mA
$I_{DM}$	Drain Current Pulsed (Note 1)	500	mA
$V_{GS}$	Gate to Source Voltage	$\pm 20$	V
$P_D$	Total Power Dissipation Single Operation ( $T_A=25^\circ C$ )	0.4	W
	Total Power Dissipation Single Operation ( $T_A=70^\circ C$ )	3.2	mW
$T_{STG}, T_J$	Operating Junction Temperature & Storage Temperature	- 55 ~ 150	$^\circ C$
$T_L$	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 10 seconds.	300	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Value			Units
		Min.	Typ.	Max.	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	312.5	$^\circ C/W$

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## Electrical Characteristics (T<sub>J</sub> = 25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	60	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature coefficient	I <sub>D</sub> = 250uA, referenced to 25 °C	-	48	-	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125 °C	-	-	1 1000	uA
I <sub>GSS</sub>	Gate-Source Leakage, Forward	V <sub>GS</sub> = 20V, V <sub>DS</sub> = 0V	-	-	100	nA
	Gate-Source Leakage, Reverse	V <sub>GS</sub> = -20V, V <sub>DS</sub> = 0V	-	-	-100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	1.0	-	2.5	V
R <sub>DS(ON)</sub>	Static Drain-Source On-state Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 500mA V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 75mA	- -	1.55 1.9	5 5.3	Ω
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25V, f = 1MHz	-	20	25	pF
C <sub>oss</sub>	Output Capacitance		-	11	14	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	3	4	
<b>Dynamic Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = 30V, I <sub>D</sub> = 200mA, R <sub>G</sub> = 50Ω V <sub>GS</sub> = 10 V (Note 2,3)	-	4	18	ns
t <sub>r</sub>	Rise Time		-	2.5	15	
t <sub>d(off)</sub>	Turn-off Delay Time		-	17	44	
t <sub>f</sub>	Fall Time		-	7	24	
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 200mA (Note 2,3)	-	0.5	0.65	nC
Q <sub>gs</sub>	Gate-Source Charge		-	0.15	-	
Q <sub>gd</sub>	Gate-Drain Charge(Miller Charge)		-	0.2	-	

## Source-Drain Diode Ratings and Characteristics

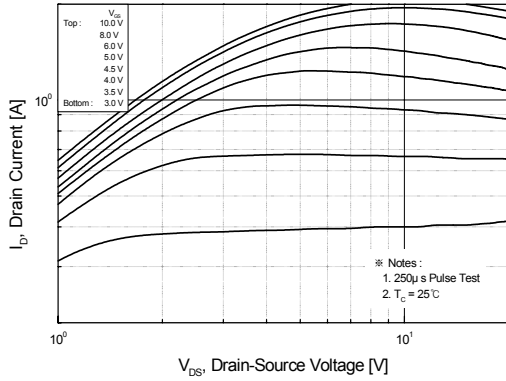
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I <sub>S</sub>	Maximum Continuous Diode Forward Current		-	-	200	mA
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> = 200mA, V <sub>GS</sub> = 0V (Note 2)	-	-	1.2	V

### ※ NOTES

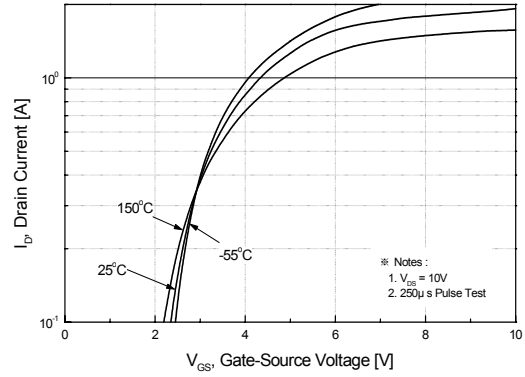
1. Repeatability rating : pulse width limited by junction temperature
2. Pulse Test : Pulse Width ≤ 300us, Duty Cycle ≤ 2%
3. Essentially independent of operating temperature.



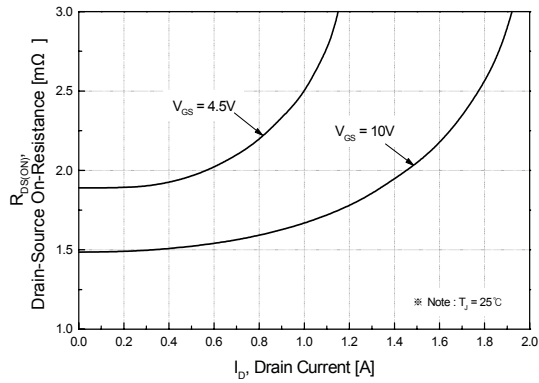
**Fig 1. On-State Characteristics**



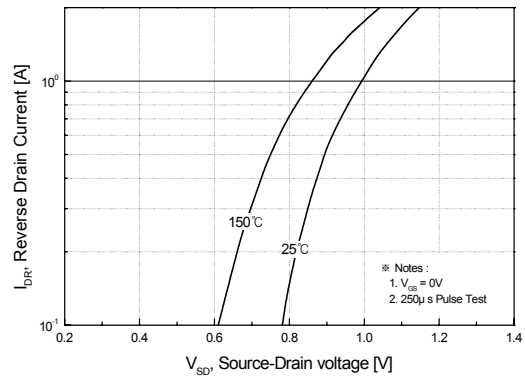
**Fig 2. Transfer Characteristics**



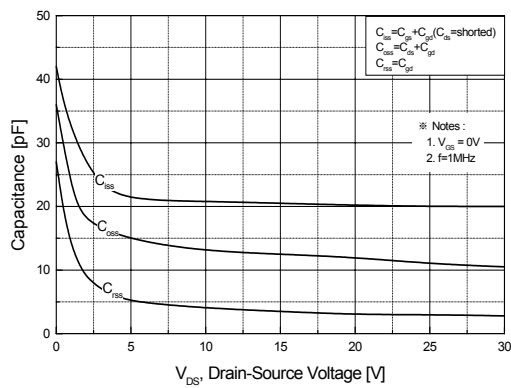
**Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage**



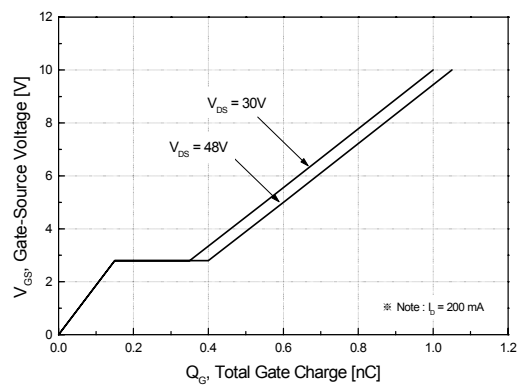
**Fig 4. On State Current vs. Allowable Case Temperature**



**Fig 5. Capacitance Characteristics**

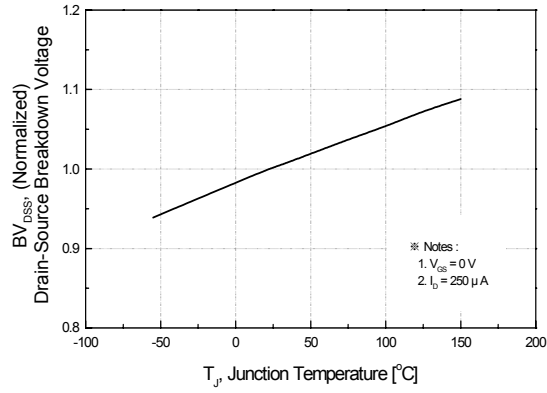


**Fig 6. Gate Charge Characteristics**



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



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

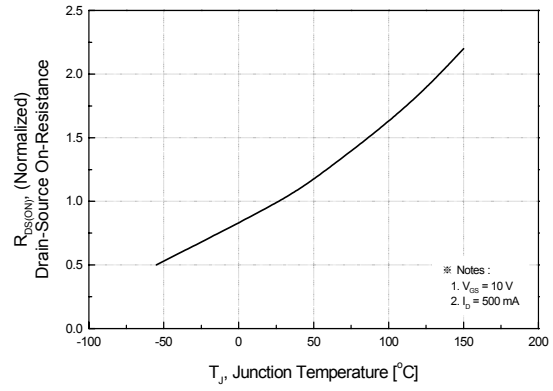


Fig. 9. Gate Charge Test Circuit & Waveforms

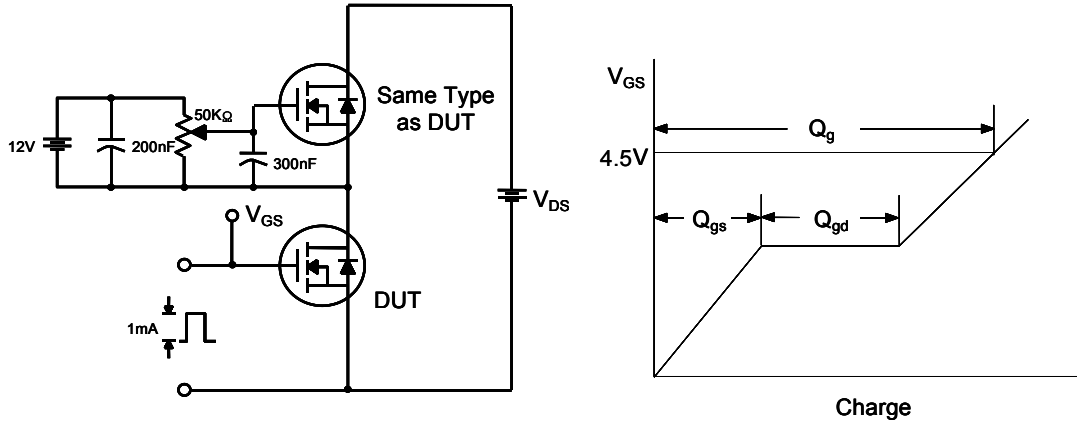
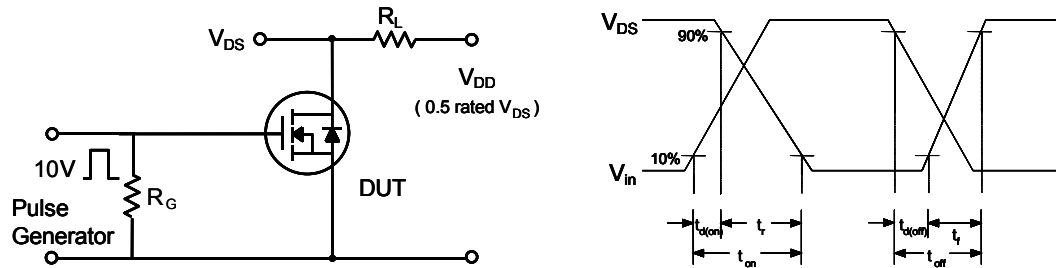


Fig 10. Switching Time Test Circuit & Waveforms



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## TO-92 Package Dimension

Dim.	mm			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		4.2			0.165	
B			3.7			0.146
C	4.43		4.83	0.174		0.190
D	14.07		14.87	0.554		0.585
E			0.4			0.016
F	4.43		4.83	0.174		0.190
G			0.45			0.017
H		2.54			0.100	
I		2.54			0.100	
J	0.33		0.48	0.013		0.019

