

**600V N-Channel Enhancement Mode MOSFET**
**Features**

- Fast switching
- Low Gate Charge
- Improved dv/dt capability
- 100% avalanche tested
- Green Device Available

**Applications**

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- AC to DC Converters

**Product Summary**


$V_{DS}$	600	V
$I_D$	1	A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	11	$\Omega$


**Absolute Maximum Ratings ( $T_C=25^\circ C$ , unless otherwise noted)**

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	600	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current <sup>1</sup>	$I_D$	1	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	3	A
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	50	mJ
Total Power Dissipation <sup>4</sup>	$P_D$	3	W
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to 150	$^\circ C$

**Thermal Characteristics**

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	---	110	$^\circ C/W$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	---	4.17	$^\circ C/W$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	600	---	---	V
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A	---	11	15	Ω
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2.0	---	4.5	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =500V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	---	---	±100	uA
Total Gate Charge	Q <sub>g</sub>	V <sub>DD</sub> =480V, V <sub>GS</sub> =10V, I <sub>D</sub> =1A	---	5	---	nC
Gate-Source Charge	Q <sub>gs</sub>		---	1	---	
Gate-Drain Charge	Q <sub>gd</sub>		---	2.6	---	
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DD</sub> =300V, R <sub>G</sub> =25Ω, I <sub>D</sub> =0.5A	---	5	---	ns
Rise Time	T <sub>r</sub>		---	25	---	
Turn-Off Delay Time	T <sub>d(off)</sub>		---	7	---	
Fall Time	T <sub>f</sub>		---	25	---	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	120	---	pF
Output Capacitance	C <sub>oss</sub>		---	25	---	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	3	---	

**Drain-Source Diode Characteristics**

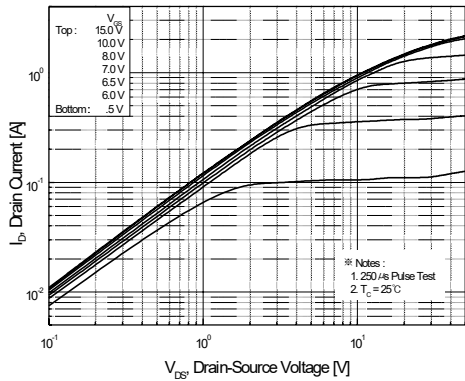
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage <sup>2</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =0.5A, T <sub>J</sub> =25°C	---	---	1.4	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =1A	---	160	---	nS
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt=100A/μs, T <sub>J</sub> =25°C	---	0.3	---	nC

**Note:**

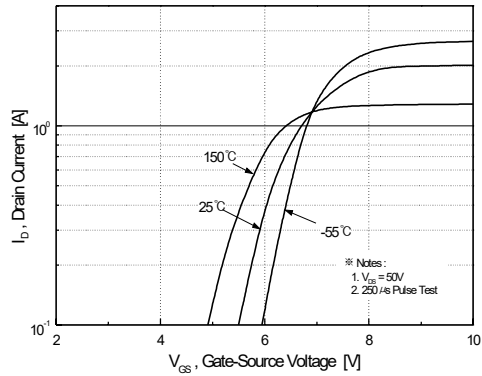
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=10mH
- 4.The power dissipation is limited by 150°C junction temperature

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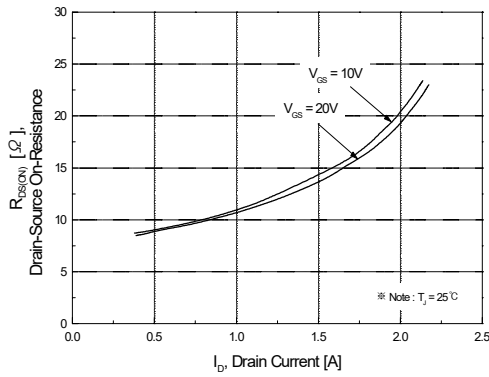
**Typical Characteristics**



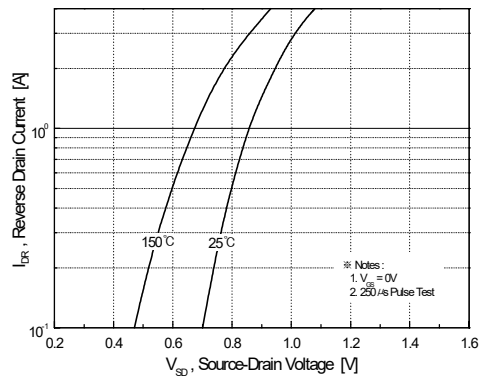
**Figure 1. On-Region Characteristics**



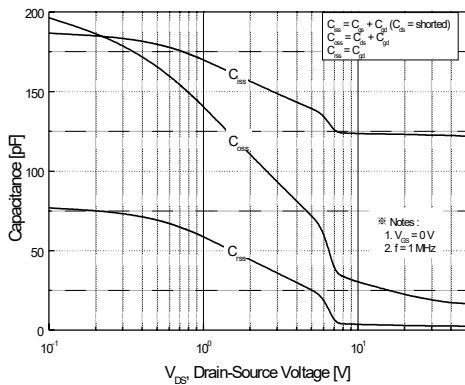
**Figure 2. Transfer Characteristics**



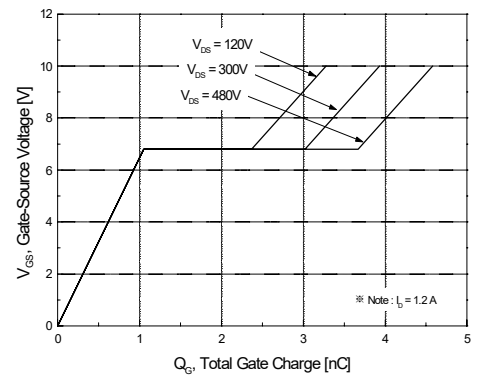
**Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage**



**Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature**

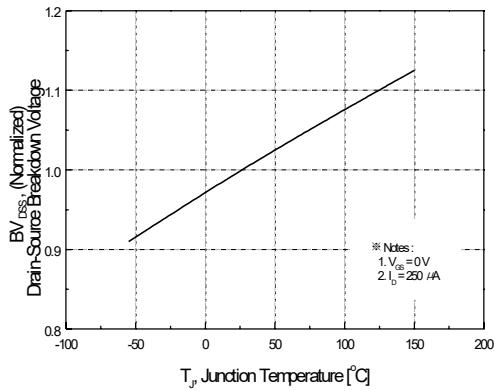


**Figure 5. Capacitance Characteristics**

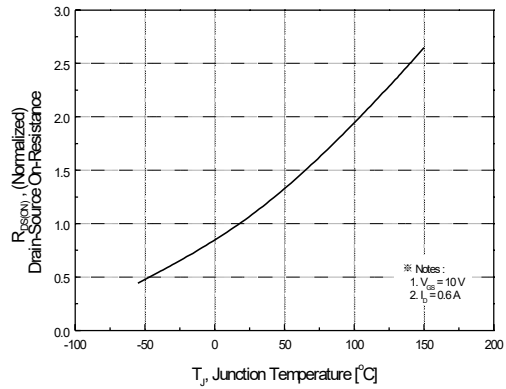


**Figure 6. Gate Charge Characteristics**

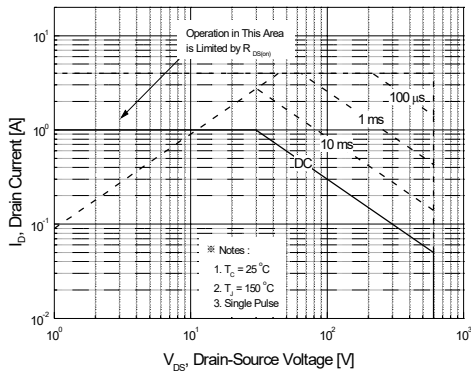
**600V N-Channel Enhancement Mode MOSFET**



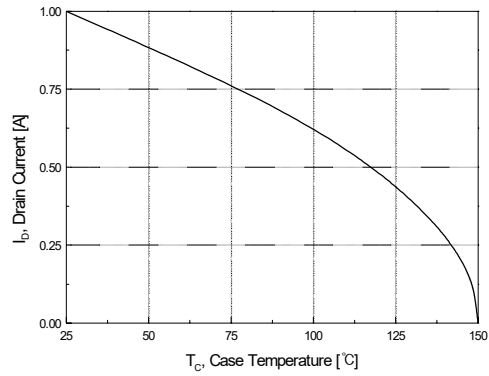
**Figure 7. Breakdown Voltage Variation vs. Temperature**



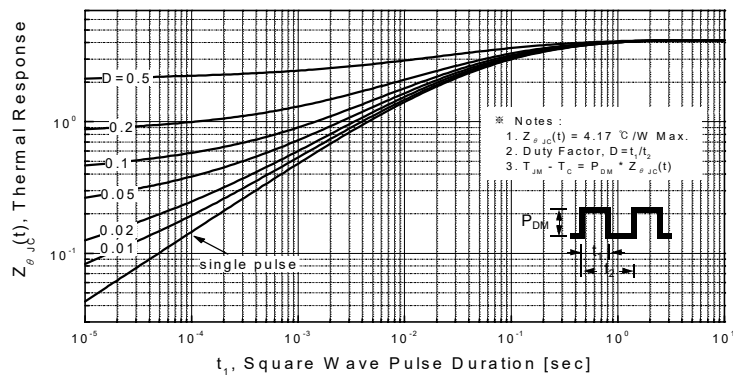
**Figure 8. On-Resistance Variation vs. Temperature**



**Figure 9. Maximum Safe Operating Area**

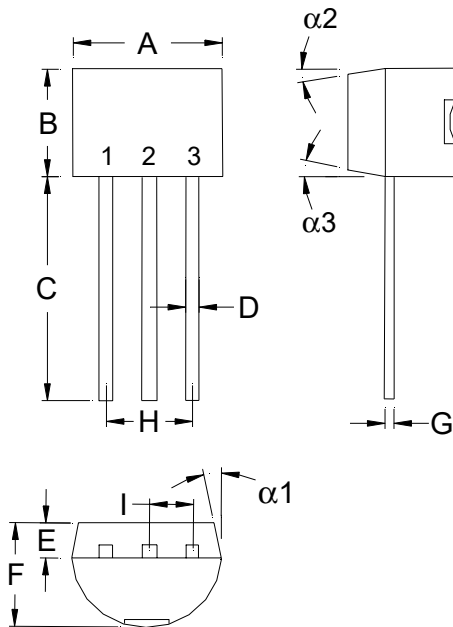


**Figure 10. Maximum Drain Current vs. Case Temperature**



**Figure 11. Transient Thermal Response Curve**

**TO-92 Package Outline Dimensions**



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1704	0.1902	4.33	4.83	G	0.0142	0.0220	0.36	0.56
B	0.1704	0.1902	4.33	4.83	H	-	*0.1000	-	*2.54
C	0.5000	-	12.70	-	I	-	*0.0500	-	*1.27
D	0.0142	0.0220	0.36	0.56	$\alpha 1$	-	*5°	-	*5°
E	-	*0.0500	-	*1.27	$\alpha 2$	-	*2°	-	*2°
F	0.1323	0.1480	3.36	3.76	$\alpha 3$	-	*2°	-	*2°