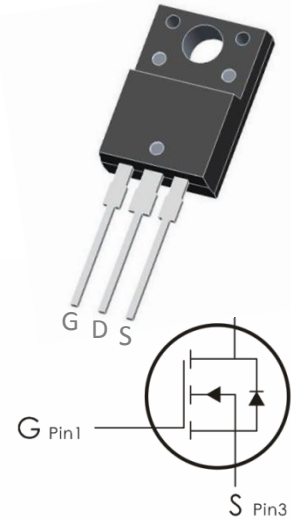


## Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. It can be used in a wide variety of applications.

## Features:

- 1)  $V_{DS}=600V, I_D=20A, R_{DS(ON)}<0.4\ \Omega @V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.



## Absolute Maximum Ratings: ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	600	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D$	Continuous Drain Current- $T_J=25^\circ\text{C}$	20	A
	Continuous Drain Current- $T_J=100^\circ\text{C}$	12.5	
$E_{AS}$	Single Pulse Avalanche Energy <sup>(note1)</sup>	1020	mJ
$I_{AR}$	Avalanche Current (note2)	20	A
$P_D$	Power Dissipation	60	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

## Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.08	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	

**Electrical Characteristics:** ( $T_c=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	600	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=600V$	---	---	10	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	2	---	4	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	---	0.4	$\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	3200	---	pF
$C_{oss}$	Output Capacitance		---	1150	---	
$C_{rss}$	Reverse Transfer Capacitance		---	80	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=300V, I_D=20A$ $R_{GEN}=25\ \Omega$ . (Note3,4)	---	62	135	ns
$t_r$	Rise Time		---	140	290	ns
$t_{d(off)}$	Turn-Off Delay Time		---	230	470	ns
$t_f$	Fall Time		---	65	140	ns
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=480V$ $I_D=20A$ . (Note3,4)	---	75	98	nC
$Q_{gs}$	Gate-Source Charge		---	13.5	18	nC
$Q_{gd}$	Gate-Drain Charge		---	36	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage	$I_D=20A$	---	---	1.4	V
$I_S$	Max. Diode Forward Current	---	---	---	20	A
$I_{SM}$	Max. Pulsed Forward Current	---	---	---	80	A

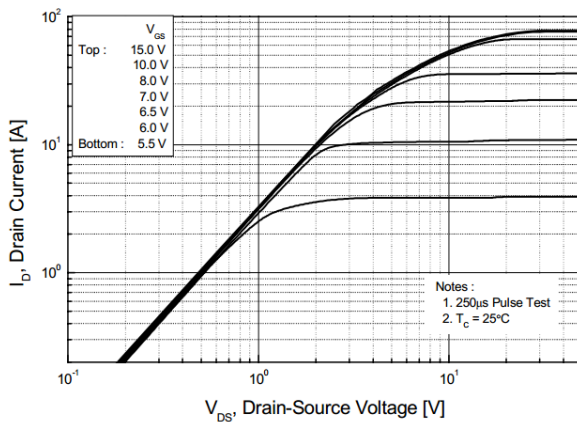
<b>Trr</b>	Reverse Recovery Time	$I_S=20A, V_{GS}=0V$ $diF/dt=100A/\mu s$ (Note3)	---	530	---	Ns
<b>qrr</b>	Reverse Recovery Charge		---	10.5	---	$\mu C$

### Notes:

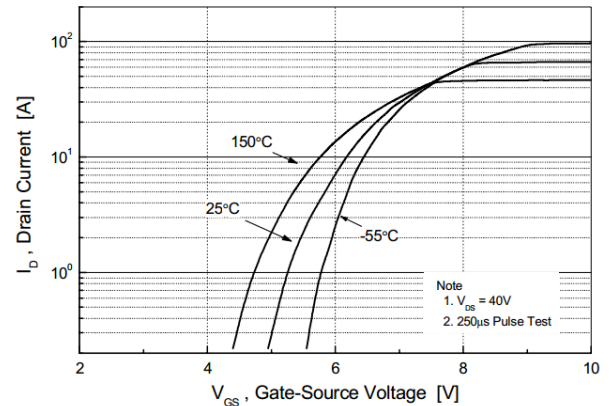
- 1, L=3.45mH, IAS=20A, VDD=50V, RG=25 $\Omega$ , Starting T<sub>J</sub> =25°C
- 2, Repetitive Rating : Pulse width limited by maximum junction temperature
- 3, Pulse Test : Pulse Width  $\leq$  300 $\mu s$ , Duty Cycle  $\leq$  2%
- 4, Essentially Independent of Operating Temperature

Typical Characteristics: (T<sub>c</sub>=25°C unless otherwise noted)

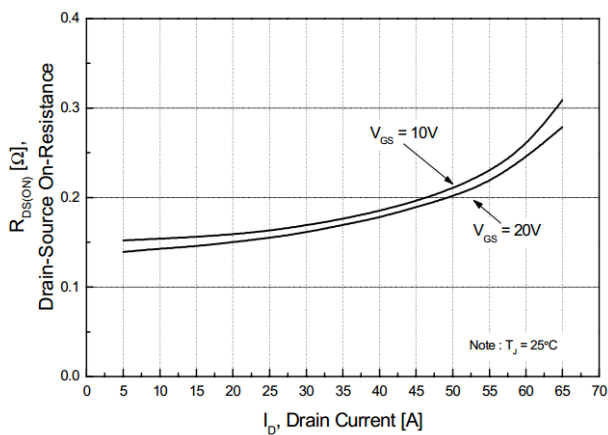
**Figure 1. On-Region Characteristics**



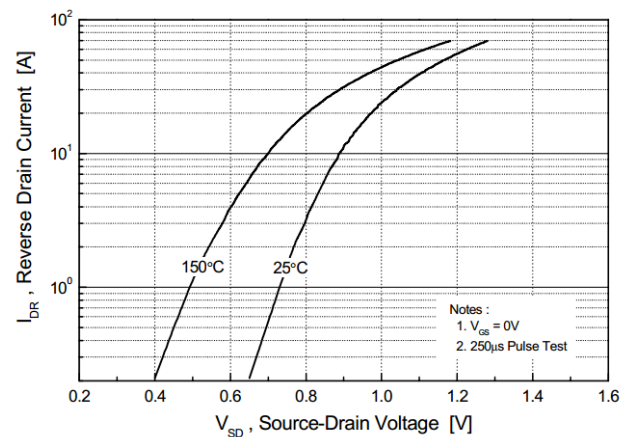
**Figure 2. Transfer Characteristics**



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



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



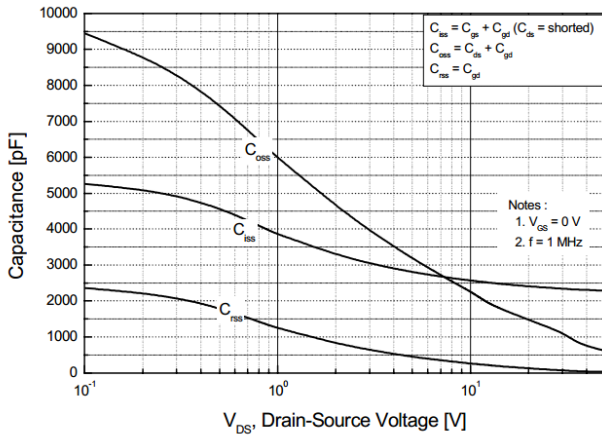
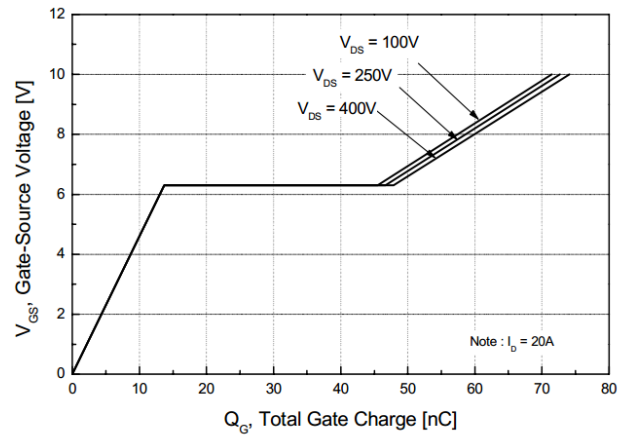
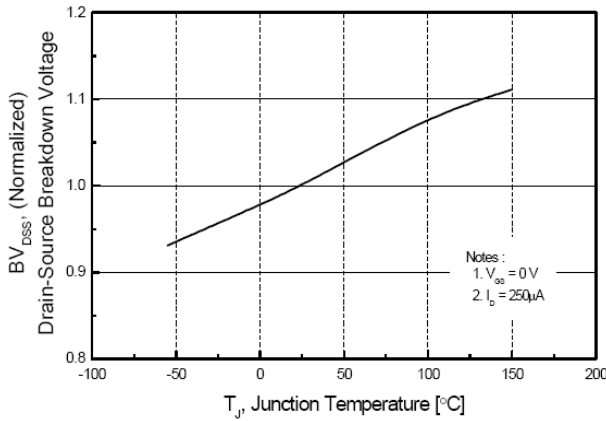
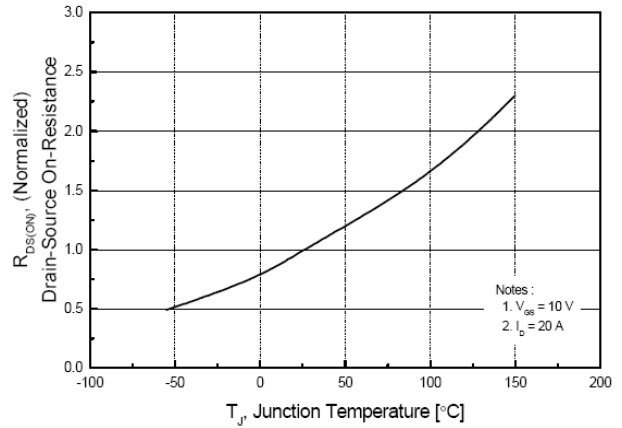
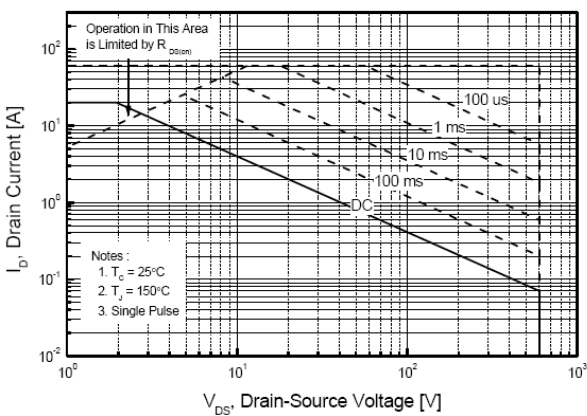
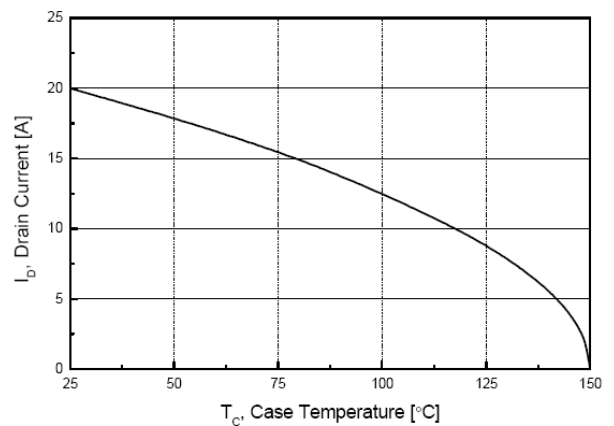
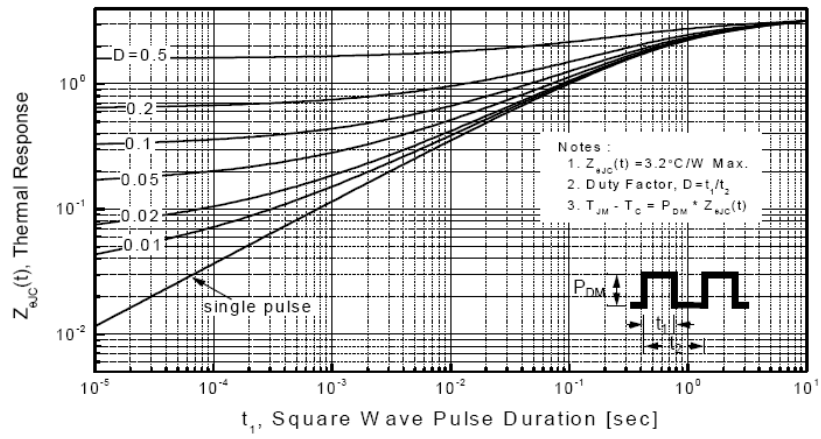
**Figure 5. Capacitance Characteristics**

**Figure 6. Gate Charge Characteristics**

**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



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