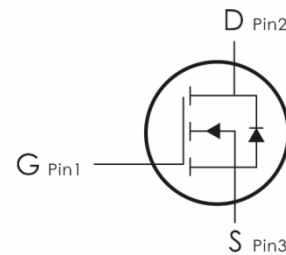
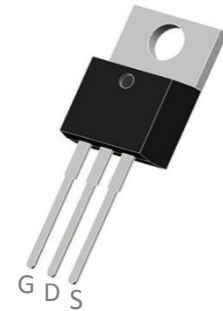


## Description:

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)  $V_{DS}=40V, I_D=120A, R_{DS(ON)}<4m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.



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

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	40	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current <sup>1</sup>	120	A
	Continuous Drain Current- $T_C=100^\circ\text{C}$	85	
	Pulsed Drain Current <sup>2</sup>	330	
$E_{AS}$	Single Pulse Avalanche Energy <sup>3</sup>	1080	mJ
$P_D$	Power Dissipation <sup>4</sup>	130	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +175	$^\circ\text{C}$

## Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case <sup>1</sup>	1.15	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient <sup>1</sup>	---	

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

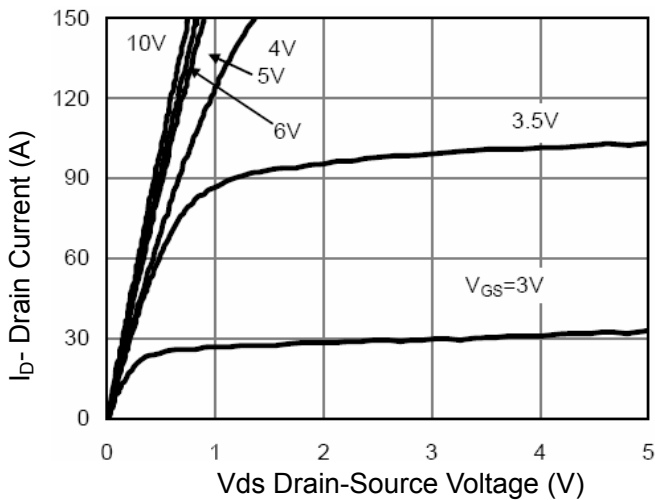
Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	40	45	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=40V$	---	---	1	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1.2	1.9	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance <sup>2</sup>	$V_{GS}=10V, I_D=20A$	---	3.2	4	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	5.5	7	
$G_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=20A$	26	---	---	S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=20V, V_{GS}=0V, f=1\text{MHz}$	---	5400	---	pF
$C_{oss}$	Output Capacitance		---	970	---	
$C_{rss}$	Reverse Transfer Capacitance		---	380	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=20V, I_D=2A,$ $R_{GEN}=3\ \Omega, V_{GS}=10V$	---	15	---	ns
$t_r$	Rise Time		---	18	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	52	---	ns
$t_f$	Fall Time		---	23	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=20V,$ $I_D=20A$	---	75	---	nC
$Q_{gs}$	Gate-Source Charge		---	10.5	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	17	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=40A$	---	---	1.2	V

<b>Ls</b>	Diode Forward Current (Note 2)	---	---	---	120	A
<b>Trr</b>	Reverse Recovery Time	T <sub>J</sub> = 25°C, I <sub>F</sub> = 40A di/dt = 100A/μs <sup>(Note3)</sup>	---	42	---	NS
<b>Qrr</b>	Reverse Recovery Charge		---	45	---	NC

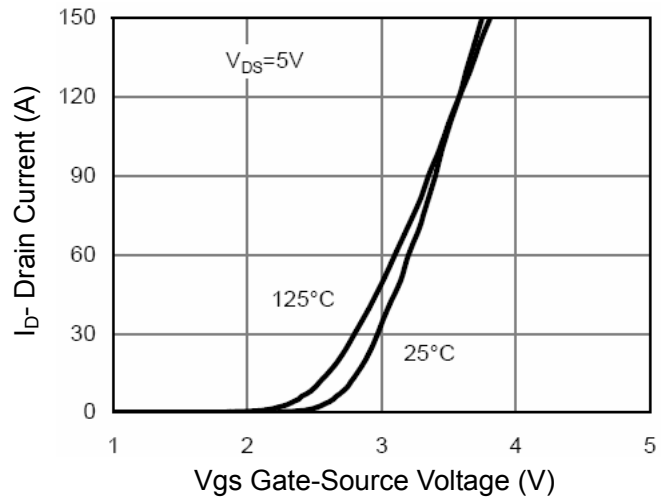
### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E<sub>AS</sub> condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=20V, V<sub>G</sub>=10V, L=1mH, R<sub>g</sub>=25Ω, I<sub>AS</sub>=46.5A

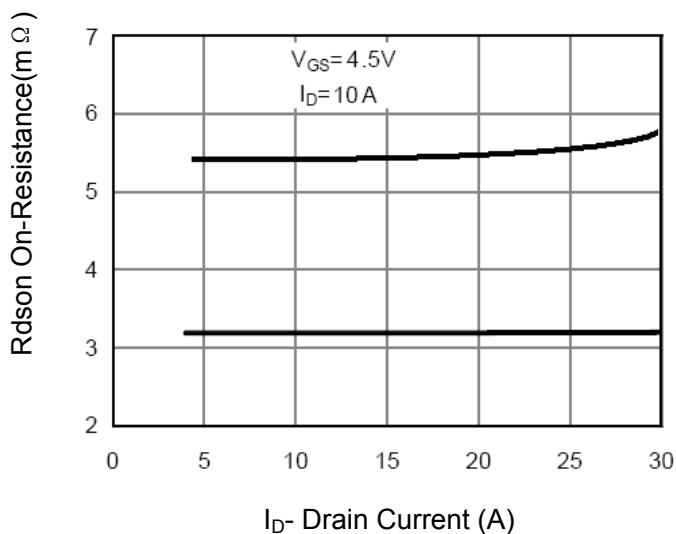
### Typical Characteristics: (T<sub>c</sub>=25°C unless otherwise noted)



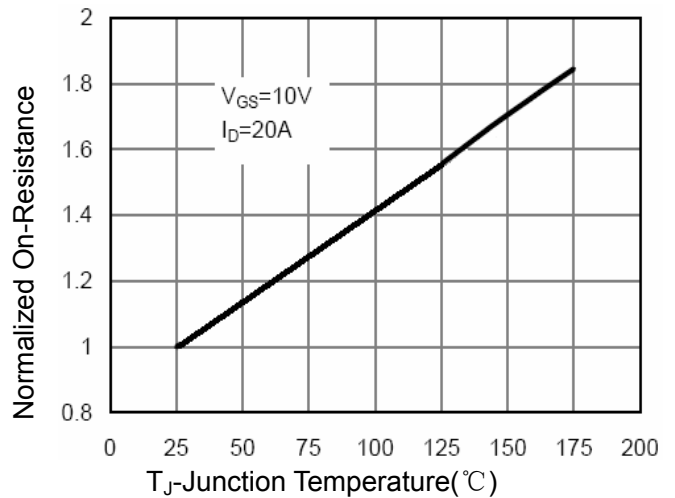
**Figure 1 Output Characteristics**



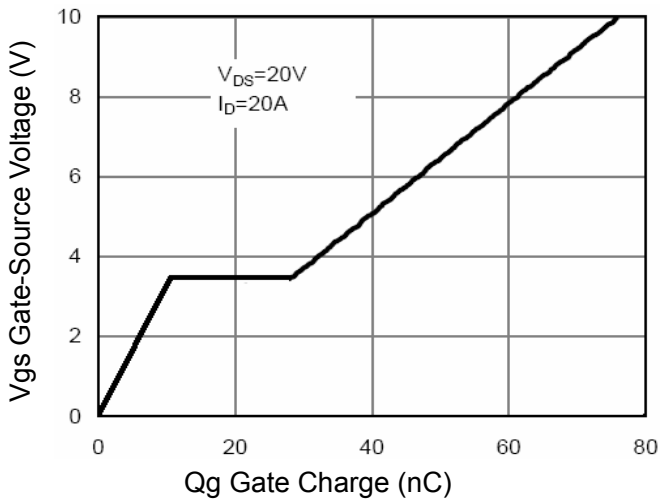
**Figure 2 Transfer Characteristics**



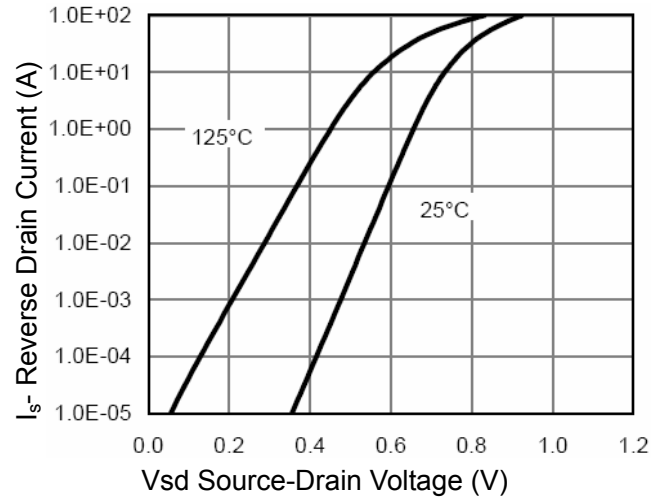
**Figure 3 Rdson- Drain Current**



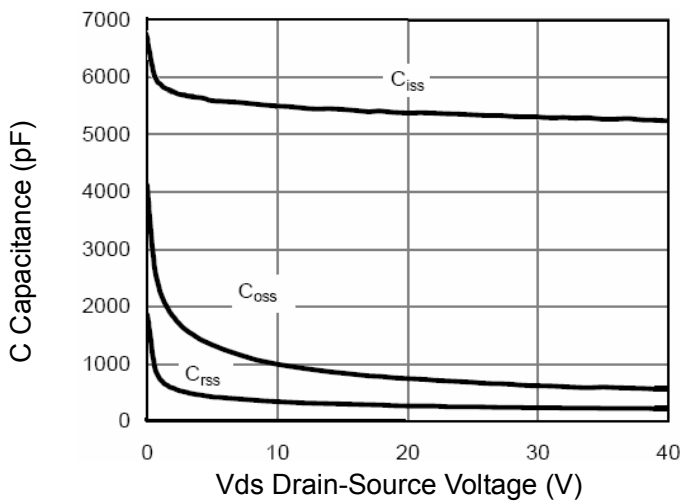
**Figure 4 Rdson-Junction Temperature**



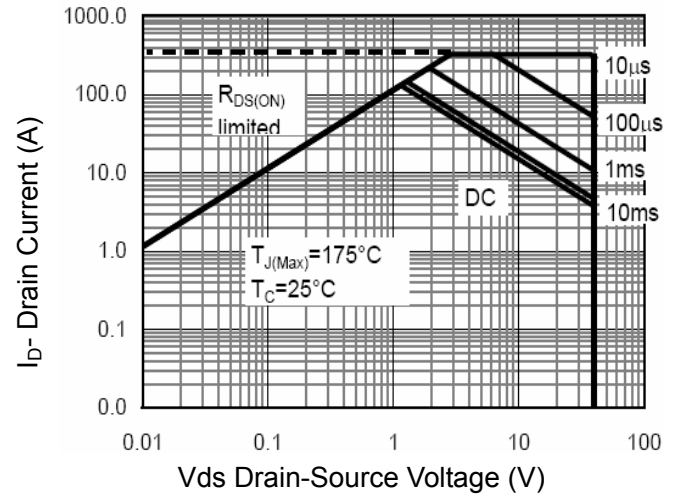
**Figure 5 Gate Charge**



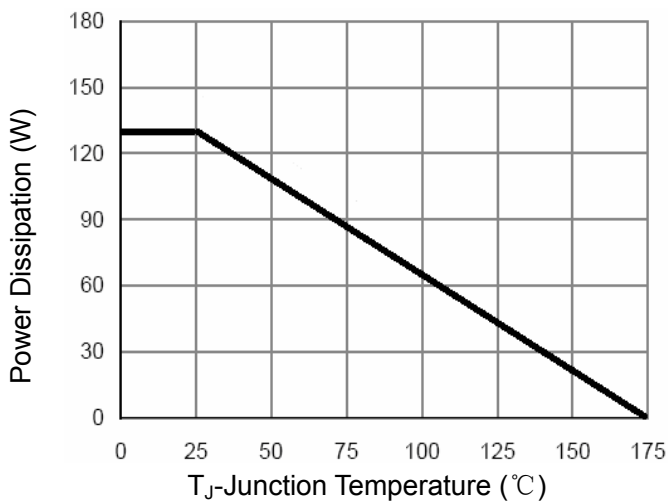
**Figure 6 Source- Drain Diode Forward**



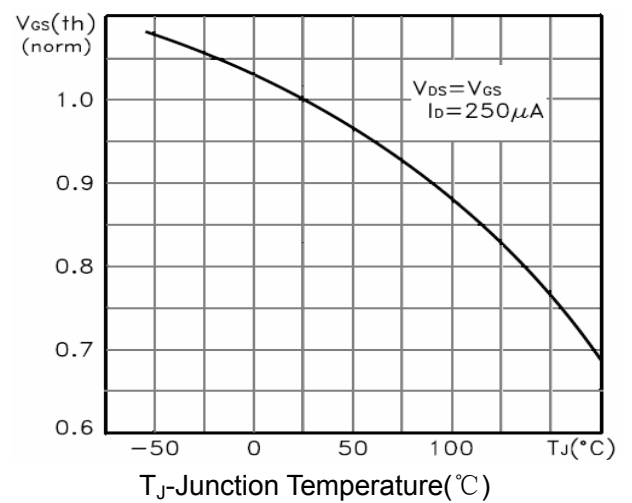
**Figure 7 Capacitance vs Vds**



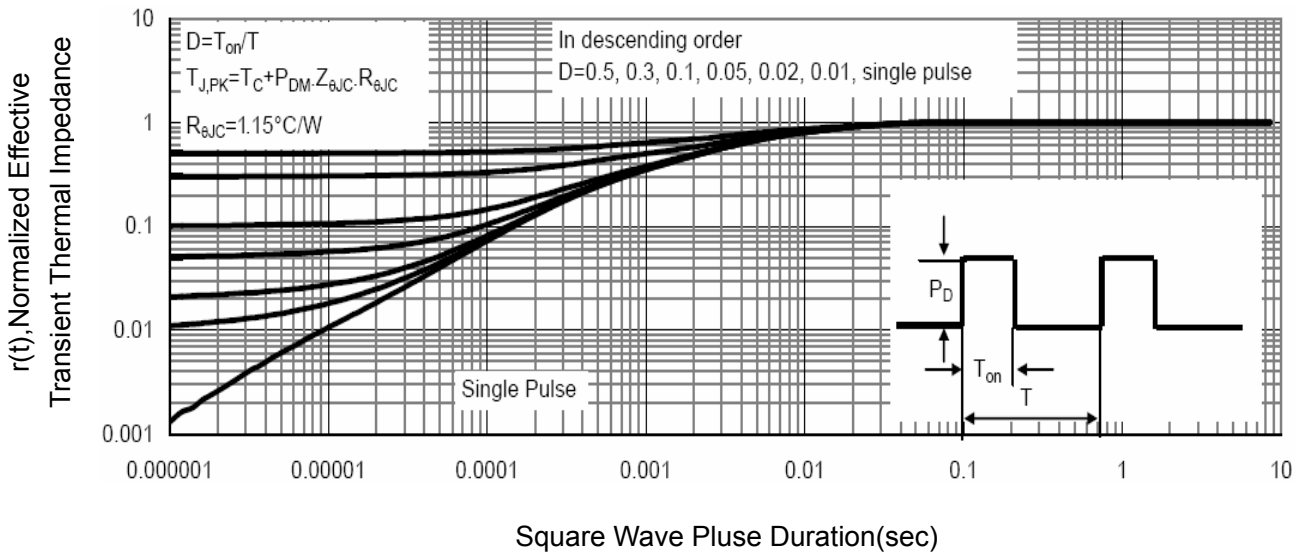
**Figure 8 Safe Operation Area**



**Figure 9 Power De-rating**



**Figure 10 VGS(th) vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**



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