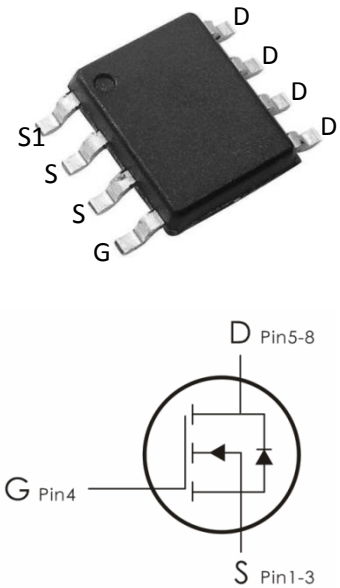


## Description:

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)  $V_{DS}=30V, I_D=20A, R_{DS(ON)} < 6m\ \Omega @ V_{GS}=10V$
- 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	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_c=25^\circ\text{C}$ )	20	A
	Drain Current - Continuous ( $T_c=100^\circ\text{C}$ )	12.6	
$I_{DM}$	Drain Current - Pulsed <sup>1</sup>	80	
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	5.4	W
	Power Dissipation - Derate above $25^\circ\text{C}$	0.043	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

## Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	23	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	85	

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

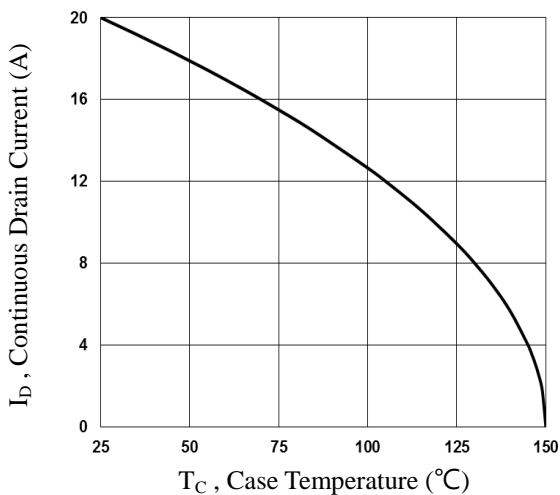
Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to $25^{\circ}\text{C}$ , $I_D=1\text{mA}$	---	0.04	---	$\text{V}/^{\circ}\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V,$ $T_J=25^{\circ}\text{C}$	---	---	1	$\mu\text{A}$
		$V_{DS}=24V, V_{GS}=0V,$ $T_J=125^{\circ}\text{C}$	---	---	10	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	VGS(th) Temperature Coefficient		---	4	---	$\text{mV}/^{\circ}\text{C}$
$R_{DS(on)}$	Static Drain-Source On Resistance	$V_{GS}=10V, I_D=10A$	---	5	6	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	6.5	9	
$G_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=10A$	---	18	---	S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	1160	1900	pF
$C_{oss}$	Output Capacitance		---	200	400	
$C_{rss}$	Reverse Transfer Capacitance		---	180	360	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time <sup>2,3</sup>	$V_{DS}=15V, I_D=15A,$ $R_{GEN}=3.3\ \Omega, V_{GS}=10V$	---	7.5	15	ns
$t_r$	Rise Time <sup>2,3</sup>		---	14.5	28	ns
$t_{d(off)}$	Turn-Off Delay Time <sup>2,3</sup>		---	35.2	60	ns
$t_f$	Fall Time <sup>2,3</sup>		---	9.6	19	ns

$Q_g$	Total Gate Charge <sup>2,3</sup>	$V_{GS}=4.5V, V_{DS}=15V,$ $I_D=20A$	---	11.1	22	nC
$Q_{gs}$	Gate-Source Charge <sup>2,3</sup>		---	1.85	3.7	nC
$Q_{gd}$	Gate-Drain "Miller" Charge <sup>2,3</sup>		---	6.8	13	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Source-Drain Diode Forward Voltage <sup>3</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1	V
$I_S$	Continuous Source Current	$V_G=V_D=0V$ , Force Current	---	---	20	A
$I_{SM}$	Pulsed Source Current		---	---	40	A

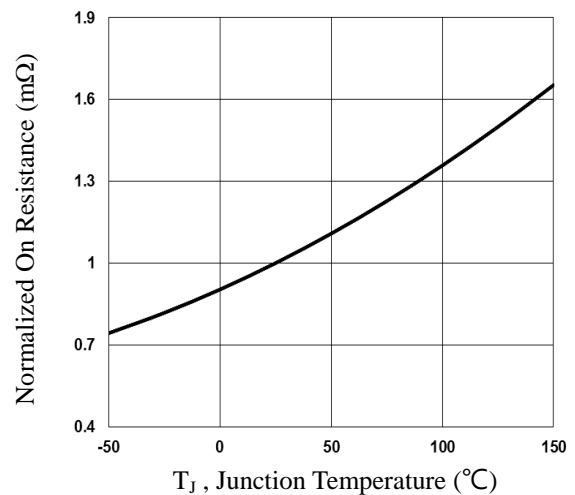
## Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

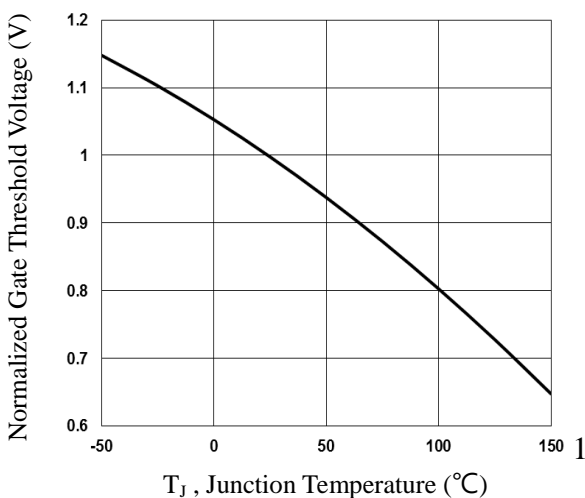
Typical Characteristics: ( $T_C=25^\circ C$  unless otherwise noted)



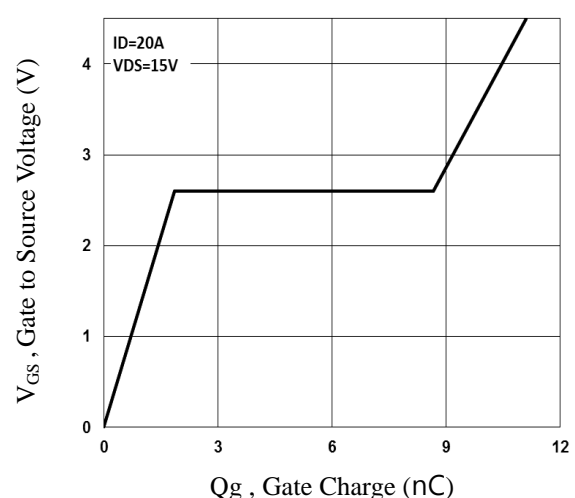
**Fig.1 Continuous Drain Current vs.  $T_C$**



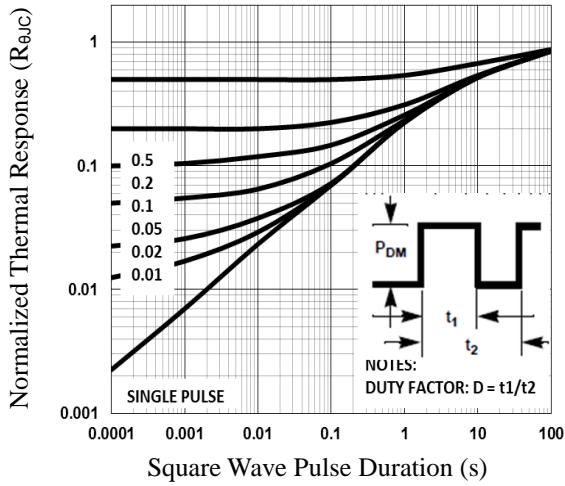
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$**



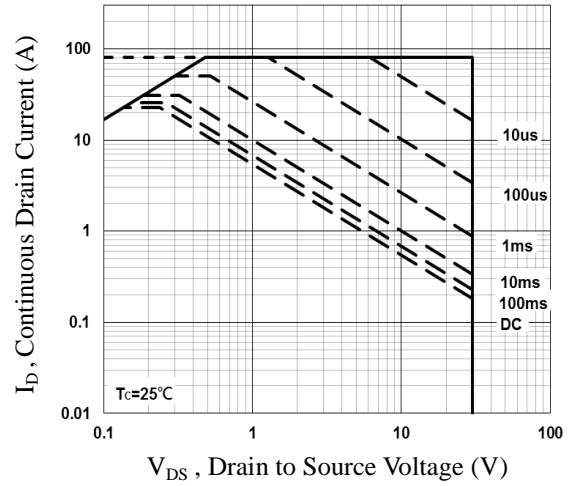
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



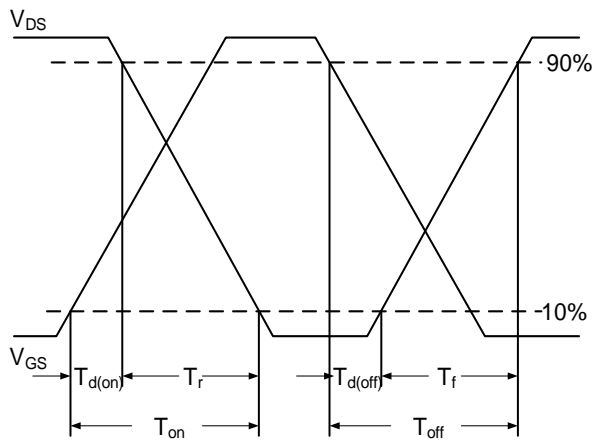
**Fig.4 Gate Charge Waveform**



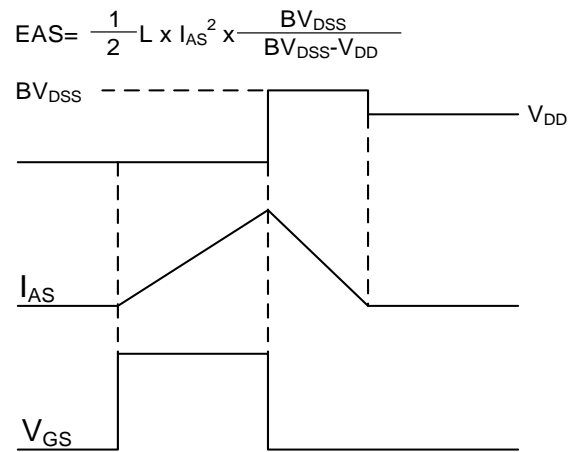
**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**



**Fig.7 Switching Time Waveform**



**Fig.8 EAS Waveform**



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