

**Features**

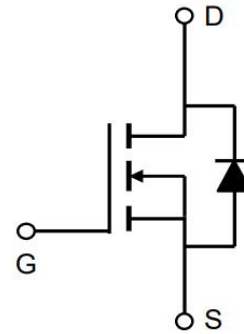
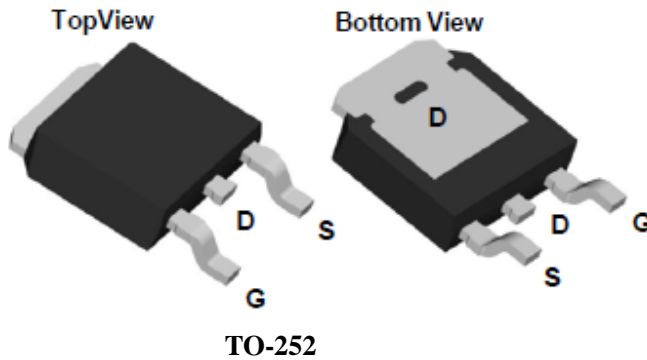
- ◆ 30V,100A,  $R_{DS(ON)} = 3.5m\Omega @ V_{GS} = 10V$
- ◆ Improved  $dv/dt$  capability
- ◆ Fast switching
- ◆ 100% EAS Guaranteed
- ◆ Green Device Available

**Applications**

- ◆ MB / VGA / Vcore
- ◆ POL Applications
- ◆ SMPS 2<sup>nd</sup> SR

**General Description**

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.


**Absolute Maximum Ratings**  $T_c=25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	100	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	65	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	400	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	90	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	28	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	80	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.43	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	150	$^\circ\text{C}$

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2.3	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	30	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =1mA	---	0.04	---	V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =30V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V , V <sub>DS</sub> =0V	---	---	±100	nA
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>3</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =20A	---	3.5	5.0	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =10A	---	5.0	9.5	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	1.5	2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4	---	mV/°C

**Dynamic Characteristics**

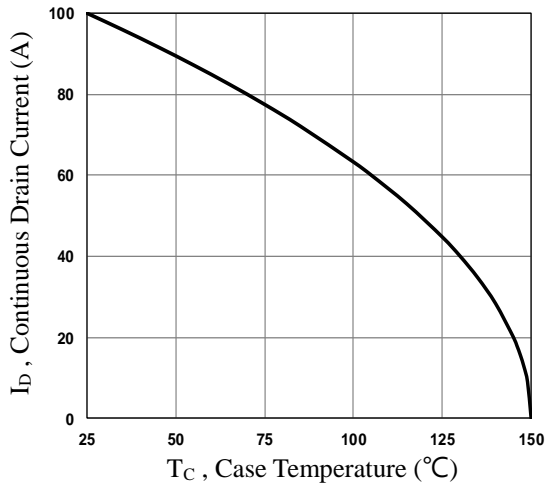
Q <sub>g</sub>	Total Gate Charge <sup>3, 4</sup>	V <sub>DS</sub> =15V , V <sub>GS</sub> =4.5V , I <sub>D</sub> =20A	---	11.1	---	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3, 4</sup>		---	1.85	---	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3, 4</sup>		---	6.8	---	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>3, 4</sup>	V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3Ω I <sub>D</sub> =15A	---	7.5	---	ns
T <sub>r</sub>	Rise Time <sup>3, 4</sup>		---	14.5	---	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3, 4</sup>		---	35.2	---	
T <sub>f</sub>	Fall Time <sup>3, 4</sup>		---	9.6	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , F=1MHz	---	3000	---	pF
C <sub>oss</sub>	Output Capacitance		---	310	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	280	---	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	2.5	---	Ω

**Drain-Source Diode Characteristics**

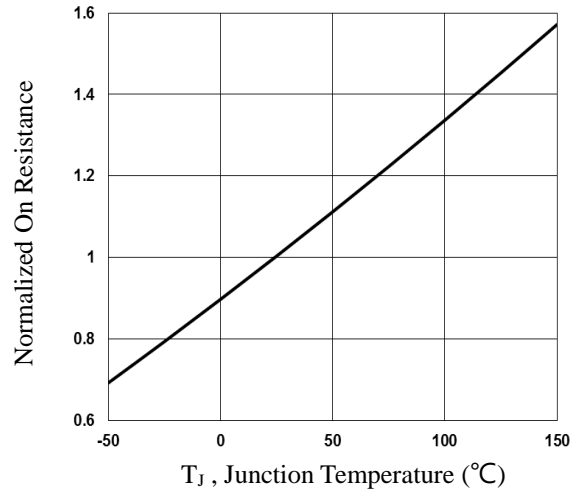
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	100	A
I <sub>SM</sub>	Pulsed Source Current <sup>3</sup>		---	---	200	A
V <sub>SD</sub>	Diode Forward Voltage <sup>3</sup>	V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25°C	---	---	1.2	V

Note :

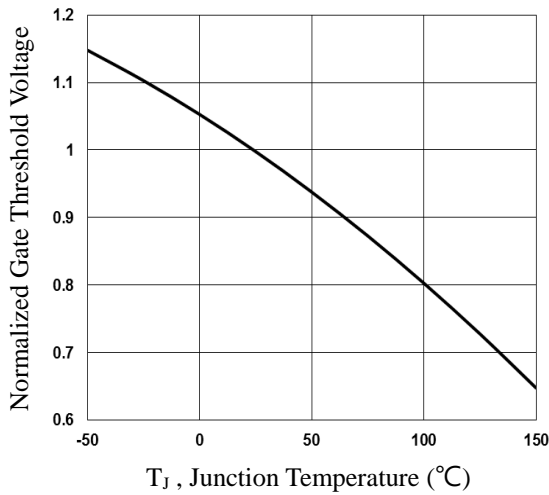
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=42A., R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



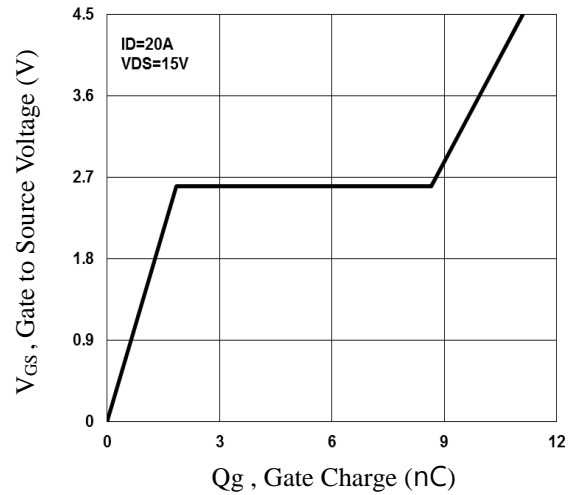
**Fig.1 Continuous Drain Current vs.  $T_c$**



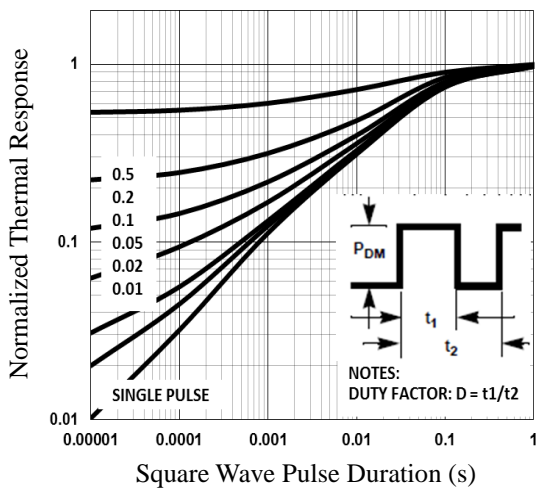
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$**



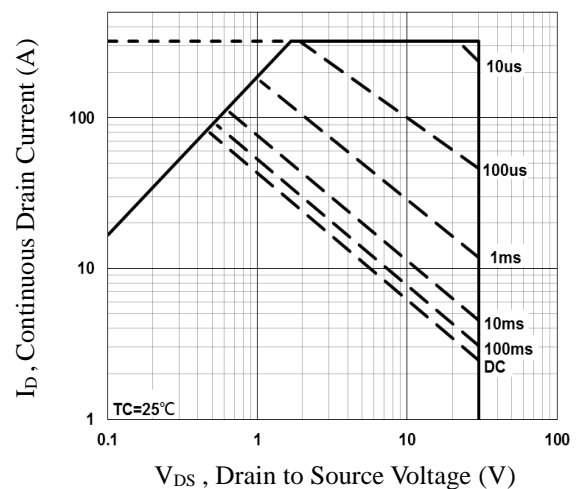
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



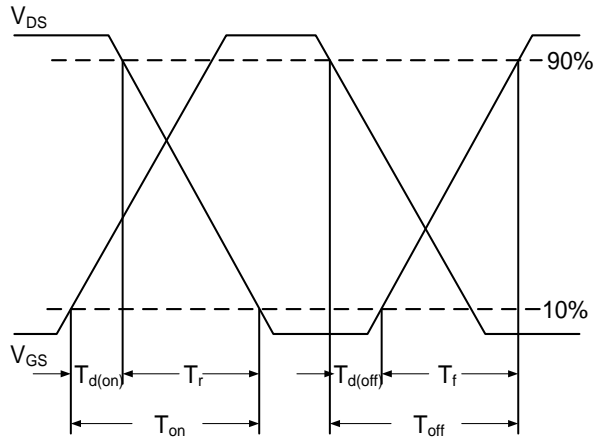
**Fig.4 Gate Charge Waveform**



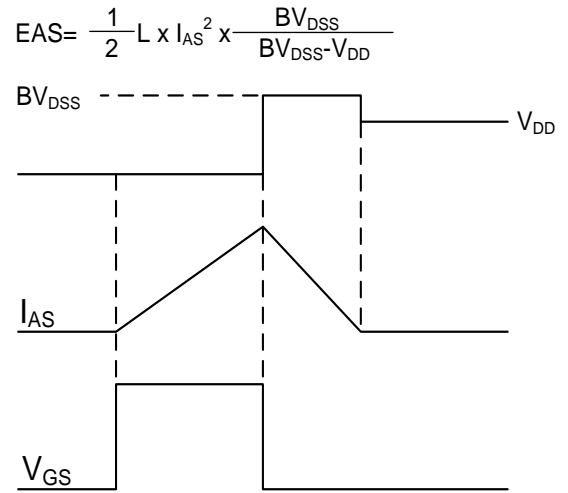
**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**

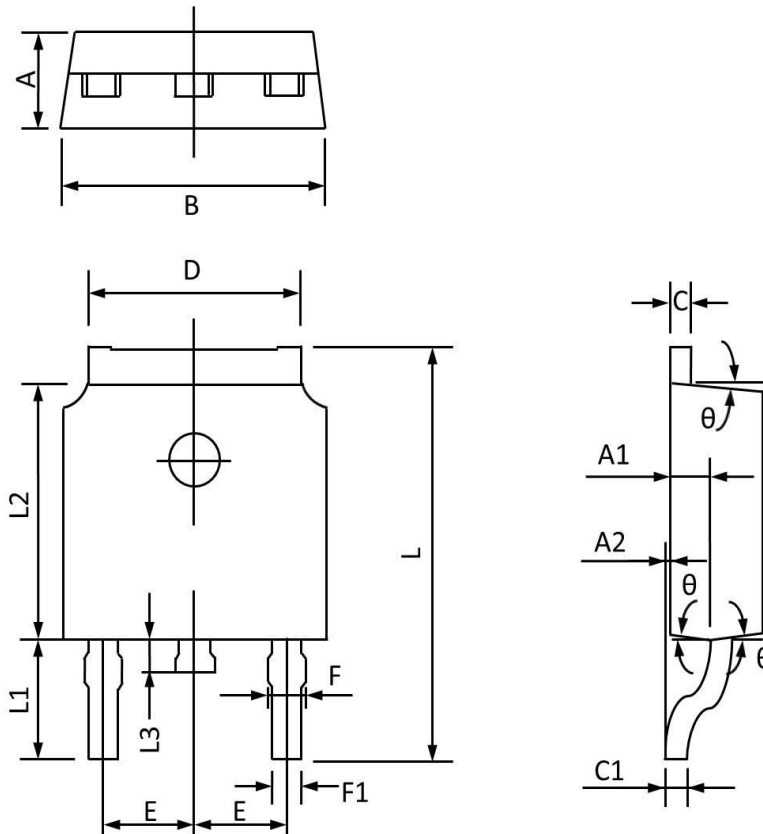


**Fig.7 Switching Time Waveform**



**Fig.8 EAS Waveform**

## TO252 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	2.450	2.150	0.096	0.085
A1	1.200	0.910	0.047	0.036
A2	0.150	0.000	0.006	0.000
B	6.800	6.300	0.268	0.248
C	0.580	0.350	0.023	0.014
C1	0.550	0.380	0.022	0.015
D	5.500	5.100	0.217	0.201
E	2.390	2.000	0.094	0.079
F	0.940	0.600	0.037	0.024
F1	0.860	0.500	0.034	0.020
L	10.400	9.400	0.409	0.370
L1	3.000	2.400	0.118	0.094
L2	6.200	5.300	0.244	0.209
L3	1.200	0.600	0.047	0.024
θ	9°	3°	9°	3°