

### General Description

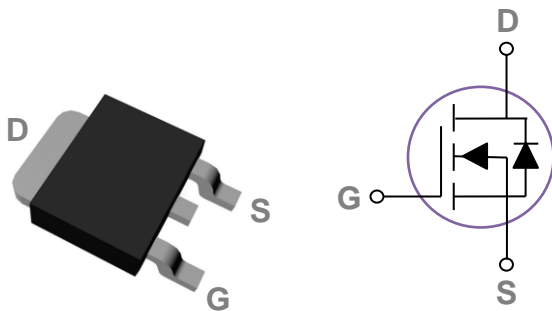
These N-Channel enhancement mode power field effect transistors are using super junction MOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BVDSS	RDSON	ID
700V	600mΩ	8A

### Features

- 700V,8A,  $R_{DS(ON)} = 600m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching

### TO252 Pin Configuration



### Applications

- PFC Power Supply Stages
- Motor Control
- DC-DC Converters
- Adapter

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	700	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	8	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	5	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	32	A
EAS	Single Pulse Avalanche Energy	700	mJ
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	67	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.54	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 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	---	1.86	$^\circ\text{C}/\text{W}$

**Electrical Characteristics ( $T_J=25\text{ }^\circ\text{C}$ , unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	700	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=700V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	$\mu A$
		$V_{DS}=560V, V_{GS}=0V, T_J=100^\circ C$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	$\pm 100$	nA

**On Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=2A$	---	520	600	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3	4	V

**Dynamic and switching Characteristics<sup>2</sup>**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$Q_g$	Total Gate Charge	$V_{DS}=350V, V_{GS}=10V, I_D=4A$	---	16	24	nC
$Q_{gs}$	Gate-Source Charge		---	2	5	
$Q_{gd}$	Gate-Drain Charge		---	7	10.5	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=350V, V_{GS}=10V, R_G=25\Omega, I_D=4A$	---	15	25	ns
$T_r$	Rise Time		---	30	45	
$T_{d(off)}$	Turn-Off Delay Time		---	90	135	
$T_f$	Fall Time		---	25	40	
$C_{iss}$	Input Capacitance	$V_{DS}=100V, V_{GS}=0V, F=1MHz$	---	535	800	pF
$C_{oss}$	Output Capacitance		---	20	30	
$C_{rss}$	Reverse Transfer Capacitance		---	1	3	
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	18	---	$\Omega$

**Guaranteed Avalanche Energy**

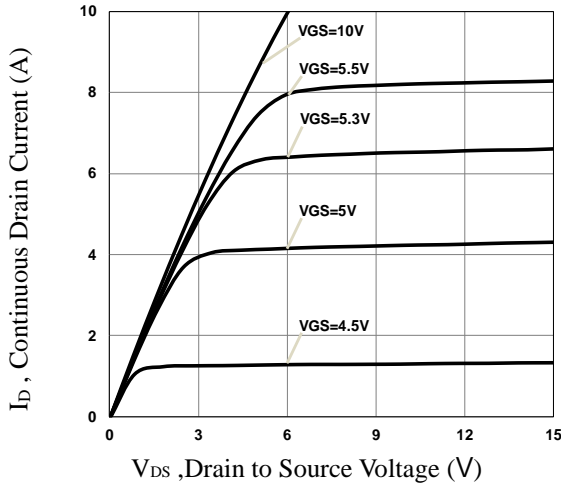
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	$V_{DD}=100V, L=79.9mH, I_{AS}=2.5A$	250	---	---	mJ

**Drain-Source Diode Characteristics and Maximum Ratings**

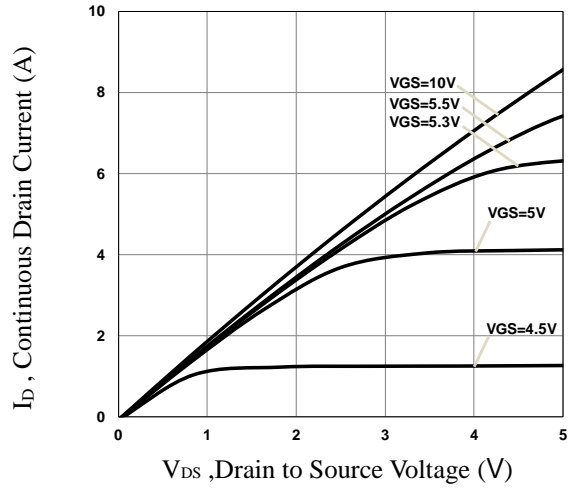
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	8	A
$I_{SM}$	Pulsed Source Current		---	---	16	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=4A, T_J=25^\circ C$	---	---	1.4	V
$t_{rr}$	Reverse Recovery Time	$V_R=400V, I_S=5A$	---	170	---	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=100A/\mu s, T_J=25^\circ C$	---	2.9	---	$\mu C$

Note :

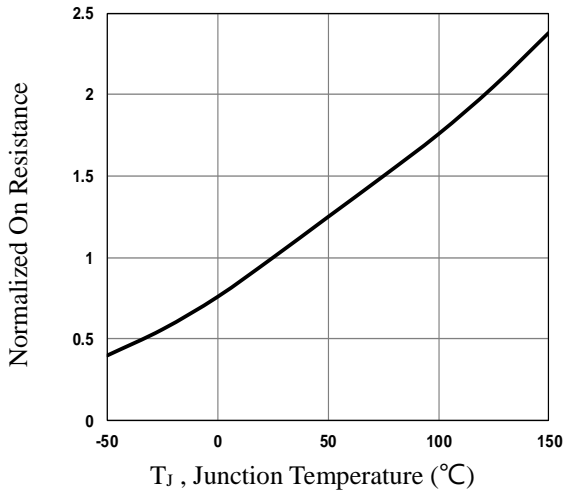
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. Essentially independent of operating temperature.



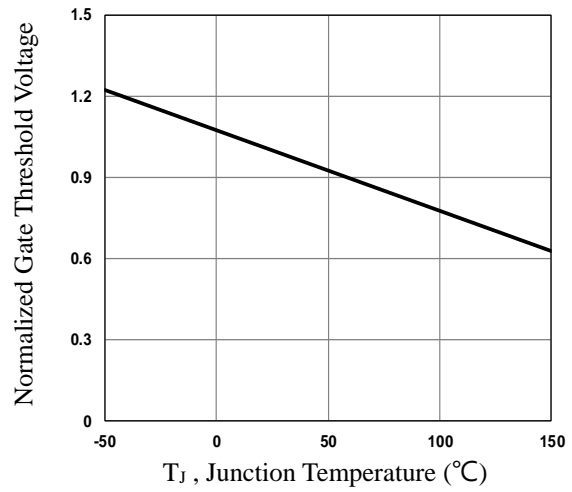
**Fig.1 Typical Output Characteristics**



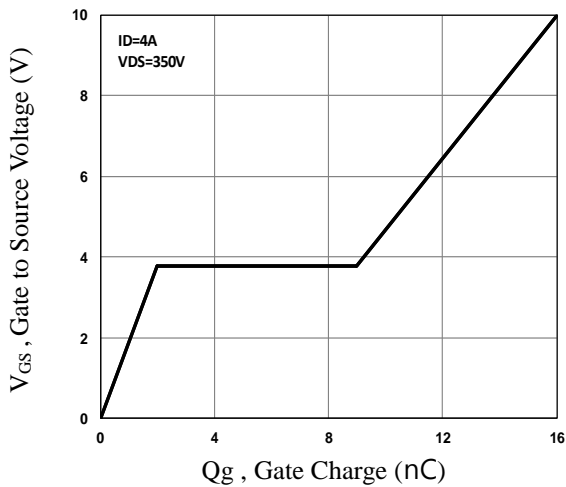
**Fig.2 Typical Output Characteristics**



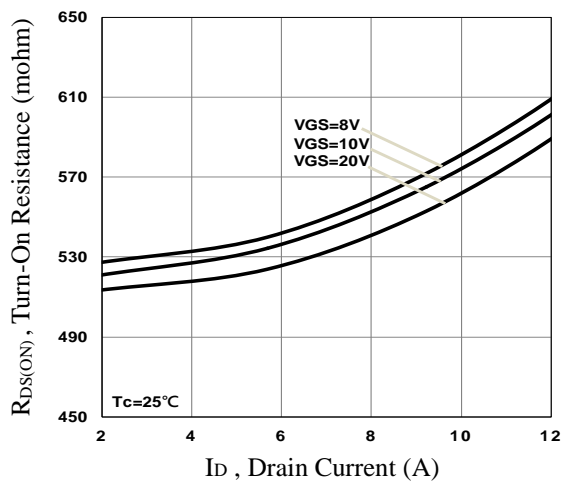
**Fig.3 Normalized  $R_{DS(on)}$  vs.  $T_J$**



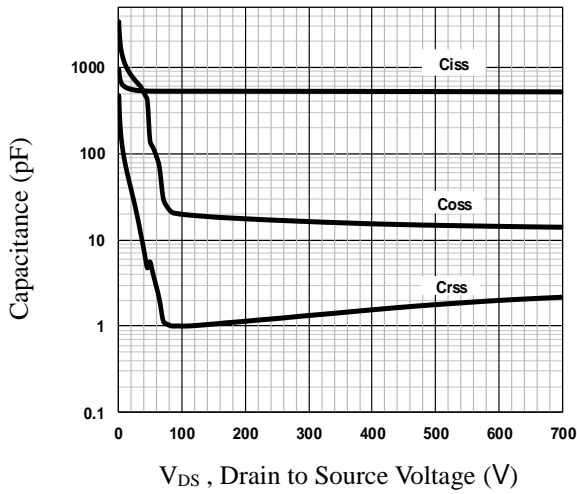
**Fig.4 Normalized  $V_{th}$  vs.  $T_J$**



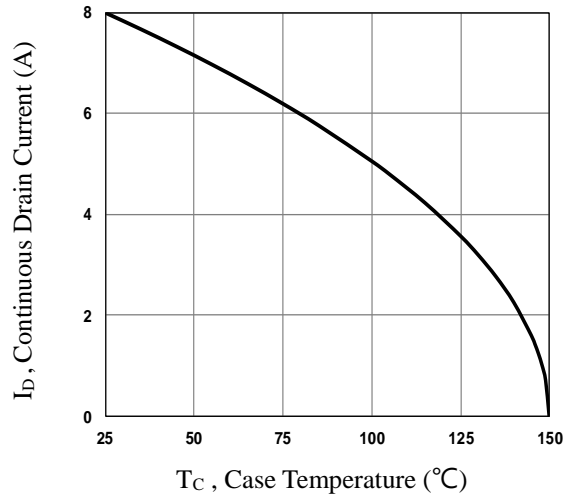
**Fig.5 Gate Charge Characteristics**



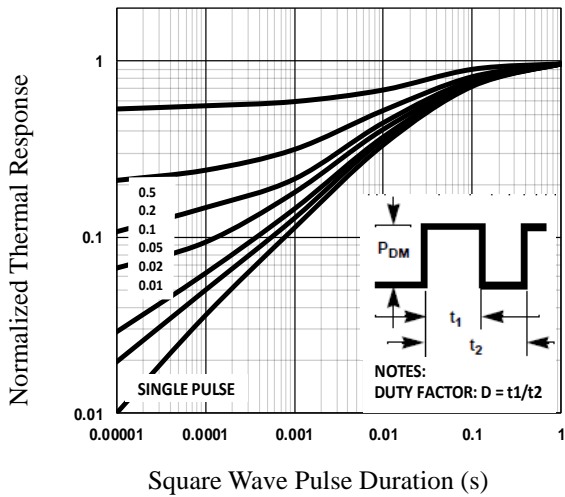
**Fig.6 Turn-On Resistance vs.  $I_D$**



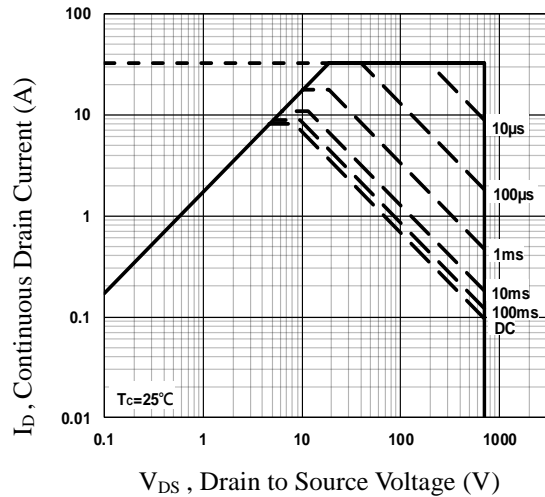
**Fig.7 Capacitance Characteristics**



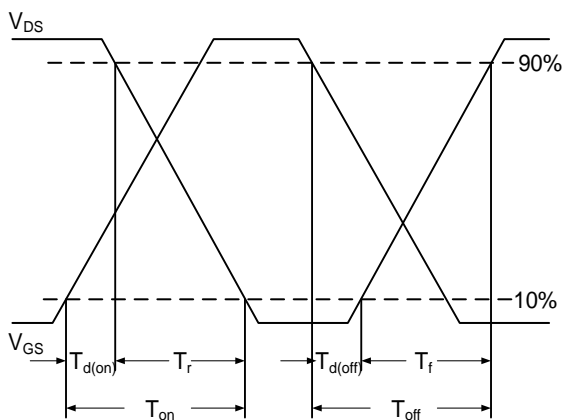
**Fig.8 Continuous Drain Current vs.  $T_c$**



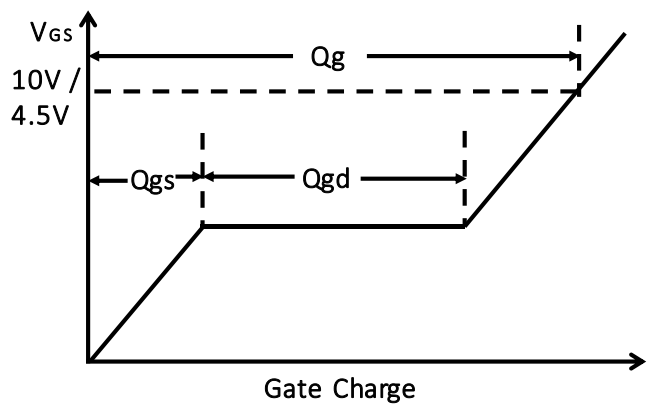
**Fig.9 Normalized Transient Impedance**



**Fig.10 Maximum Safe Operation Area**

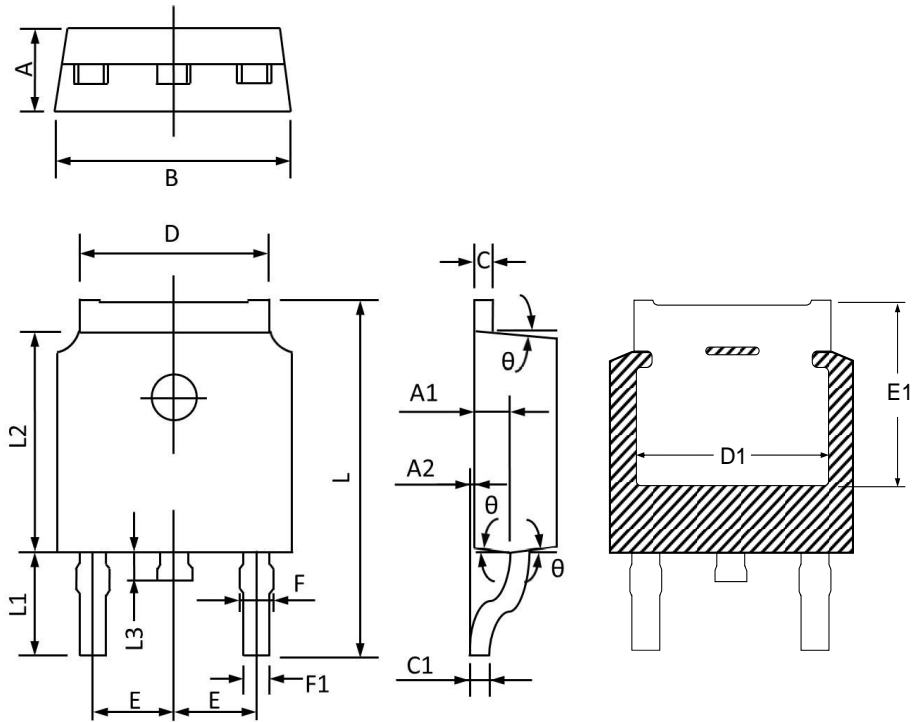


**Fig.11 Switching Time Waveform**



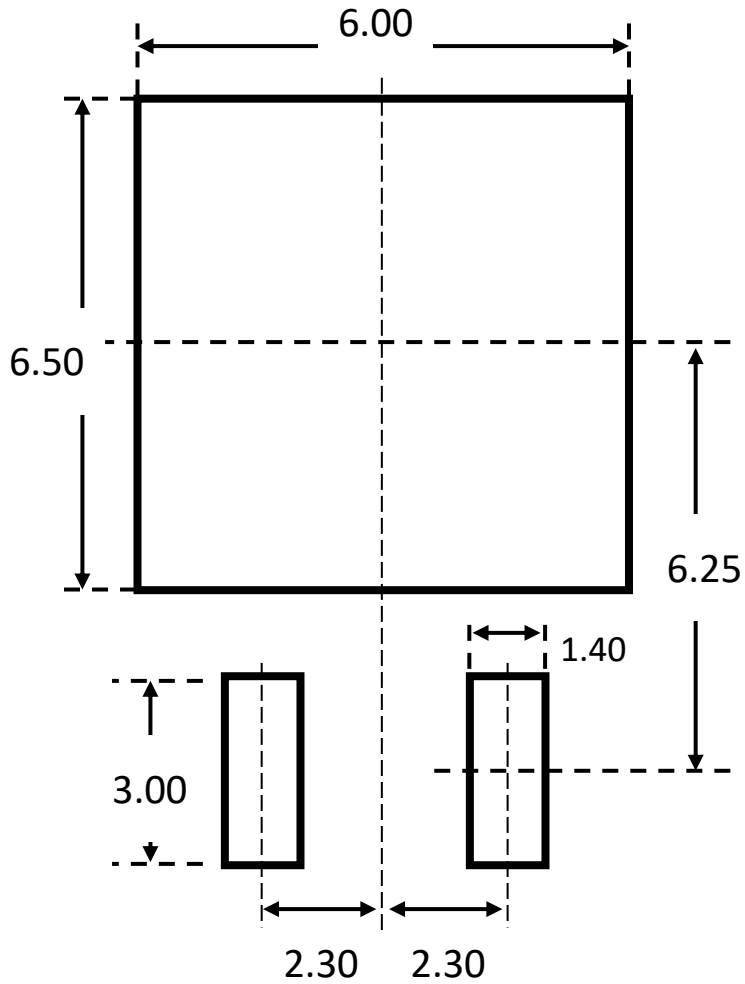
**Fig.12 Gate Charge Waveform**

**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	0.900	0.047	0.035
A2	0.250	0.000	0.010	0.000
B	6.800	6.300	0.268	0.248
C	0.600	0.350	0.024	0.014
C1	0.600	0.380	0.024	0.015
D	5.500	5.100	0.217	0.201
D1	5.400	4.950	0.212	0.195
E	2.400	2.000	0.094	0.079
E1	5.650	4.950	0.222	0.194
F	1.150	0.600	0.045	0.024
F1	0.900	0.500	0.035	0.020
L	10.400	9.400	0.409	0.370
L1	3.100	2.400	0.122	0.094
L2	6.300	5.300	0.248	0.209
L3	1.200	0.600	0.047	0.024
θ	9°	3°	9°	3°

### TO252 RECOMMENDED LAND PATTERN



unit : mm