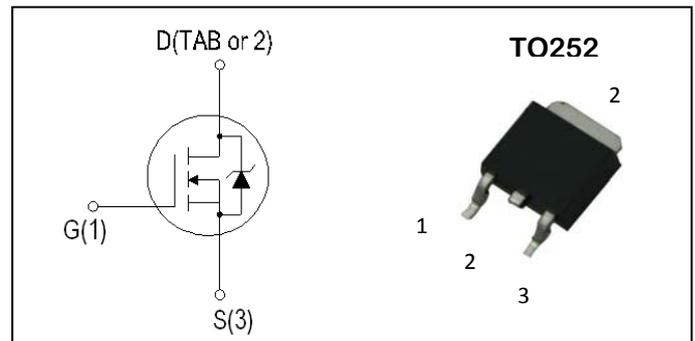


## N-Channel Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

$V_{DSS}$	$I_D$	$R_{DS(ON)}$ (m $\Omega$ )
30V	90A	4.0m $\Omega$



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

Symbol	Parameter		Ratings	Unit
<b>Common Ratings</b>				
$V_{DSS}$	Drain-Source Voltage		30	V
$V_{GSS}$	Gate-Source Voltage		$\pm 20$	
$T_J$	Maximum Junction Temperature		150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range		-55 to 150	$^\circ\text{C}$
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	90	A
<b>Mounted on Large Heat Sink</b>				
$I_{DM}$	300 $\mu\text{s}$ Pulse Drain Current Tested(1)	$T_C=25^\circ\text{C}$	200	A
$I_D$	Continuous Drain Current	$T_C=25^\circ\text{C}$	90	A
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	62.5	W

1. Pulse width limited by maximum junction temperature.

### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{thJC}$	Thermal resistance junction-case max	2.4	$^\circ\text{C}/\text{W}$
$R_{thJA}$	Thermal resistance junction-ambient max	62	$^\circ\text{C}/\text{W}$

## Electrical Characteristics (TA=25°C Unless Otherwise Noted)

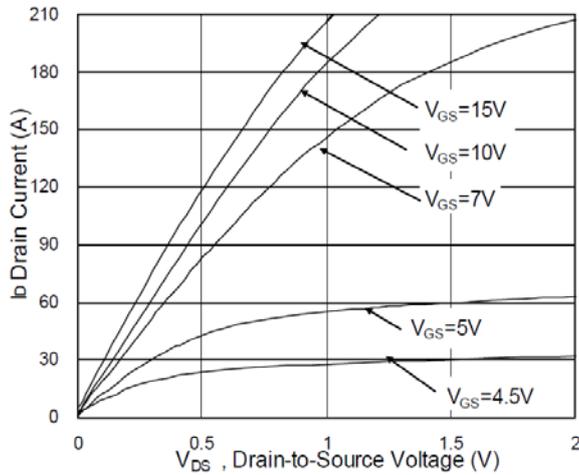
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
<b>On/off Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA	30	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 24V, V <sub>GS</sub> =0V	--	--	1	uA
		V <sub>DS</sub> =30V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C	--	--	5	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	1	2	3	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
R <sub>DS(ON)</sub>	Drain-SourceOn-stateResistance(2)	V <sub>GS</sub> = 10V, I <sub>DS</sub> =30A	--	3.4	4.0	mΩ
g <sub>FS</sub>	Forward transconductance(2)	V <sub>DS</sub> = 5V, I <sub>DS</sub> =30A	--	47	--	S
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> = 15V, Frequency=1.0MHz	--	2843	3980	pF
C <sub>oss</sub>	Output Capacitance		--	380	532	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	286	400	
<b>Switching Characteristics</b>						
t <sub>d(ON)</sub>	Turn-on Delay Time(1)	V <sub>DD</sub> =15V, I <sub>D</sub> = 15A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> =3.3 Ω	--	12.6	25.2	ns
t <sub>r</sub>	Turn-on Rise Time(1)		--	9.6	17.3	
t <sub>d(OFF)</sub>	Turn-off Delay Time(1)		--	55	110.0	
t <sub>f</sub>	Turn-off Fall Time(1)		--	5.6	11.2	
Q <sub>g</sub>	Total Gate Charge(1)	V <sub>DS</sub> =15V, V <sub>GS</sub> = 4.5V, I <sub>DS</sub> =15A	--	23.4	32.8	nC
Q <sub>gs</sub>	Gate-Source Charge(1)		--	11.4	16.0	
Q <sub>gd</sub>	Gate-Drain Charge(1)		--	8.2	11.5	
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage(2)	I <sub>SD</sub> = 1A, V <sub>GS</sub> = 0	--	--	1	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =30A, dI <sub>SD</sub> /dt=100A/μs	--	13.3	--	ns
q <sub>rr</sub>	Reverse Recovery Charge		--	4.5	--	nC

### NOTES:

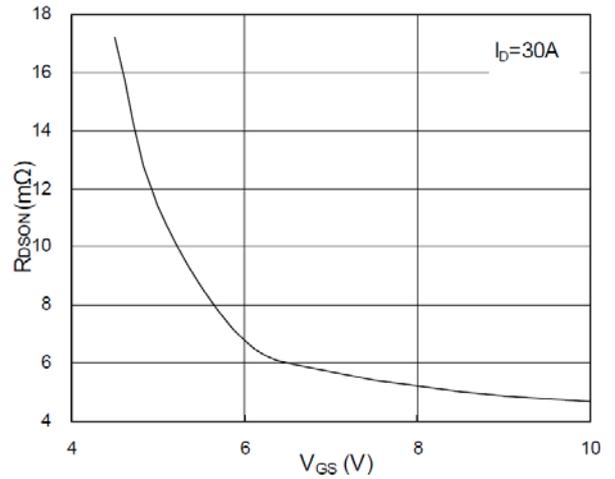
1. Independent of operating temperature.
2. Pulse Test : Pulse width ≤ 300 μ s, Duty cycle ≤ 2%

## Typical Performance Characteristics

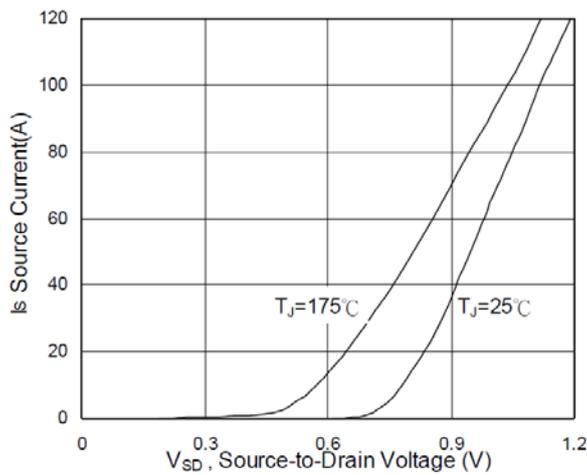
**Figure 1: On-Region Characteristics**



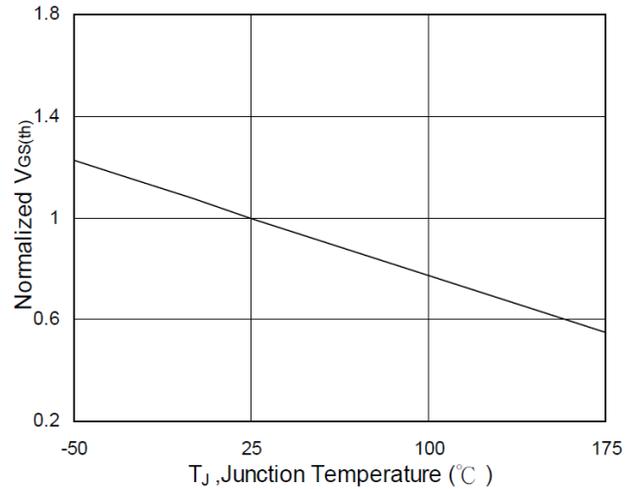
**Figure 2: On-Resistance vs. G-S Voltage**



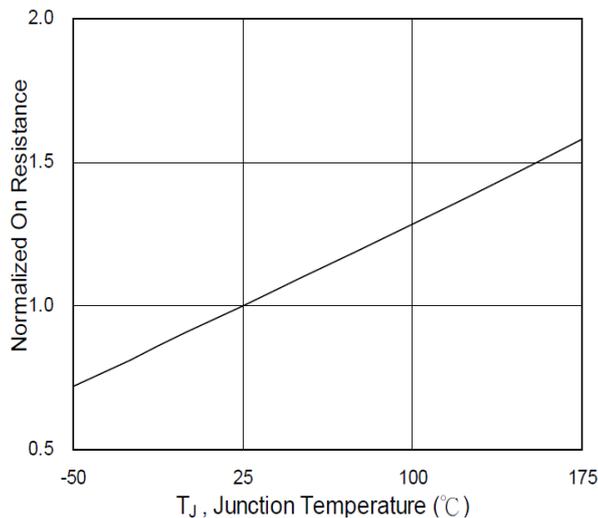
**Figure 3: Forward Characteristics of Reverse**



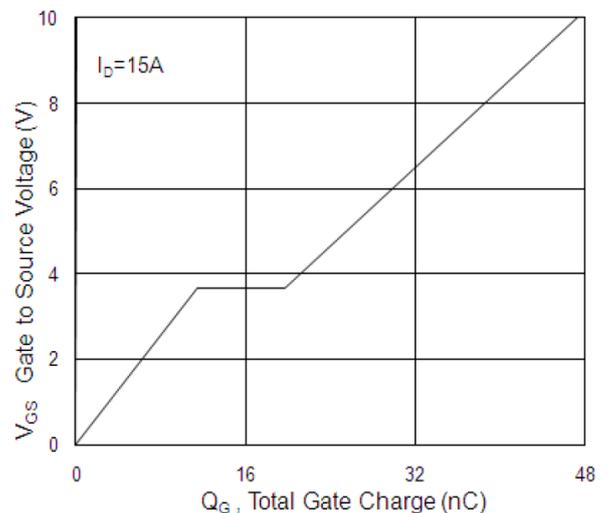
**Figure 4: Normalized  $V_{GS(th)}$  vs.  $T_J$**



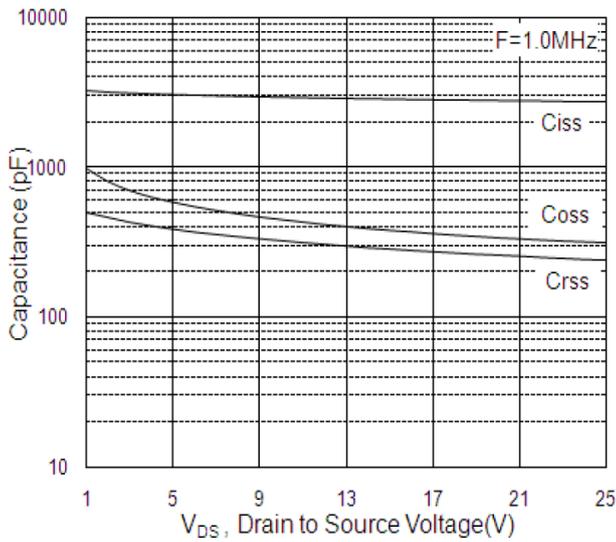
**Figure 5: Normalized  $R_{DS(on)}$  vs.  $T_J$**



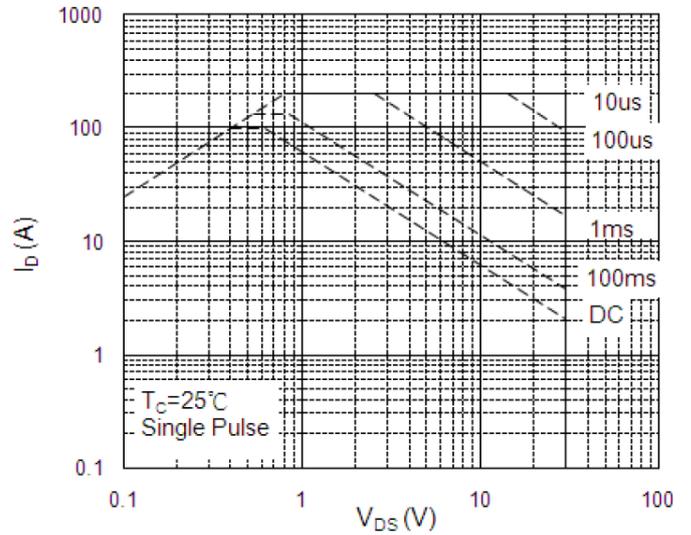
**Figure 6: Gate Charge Characteristics**



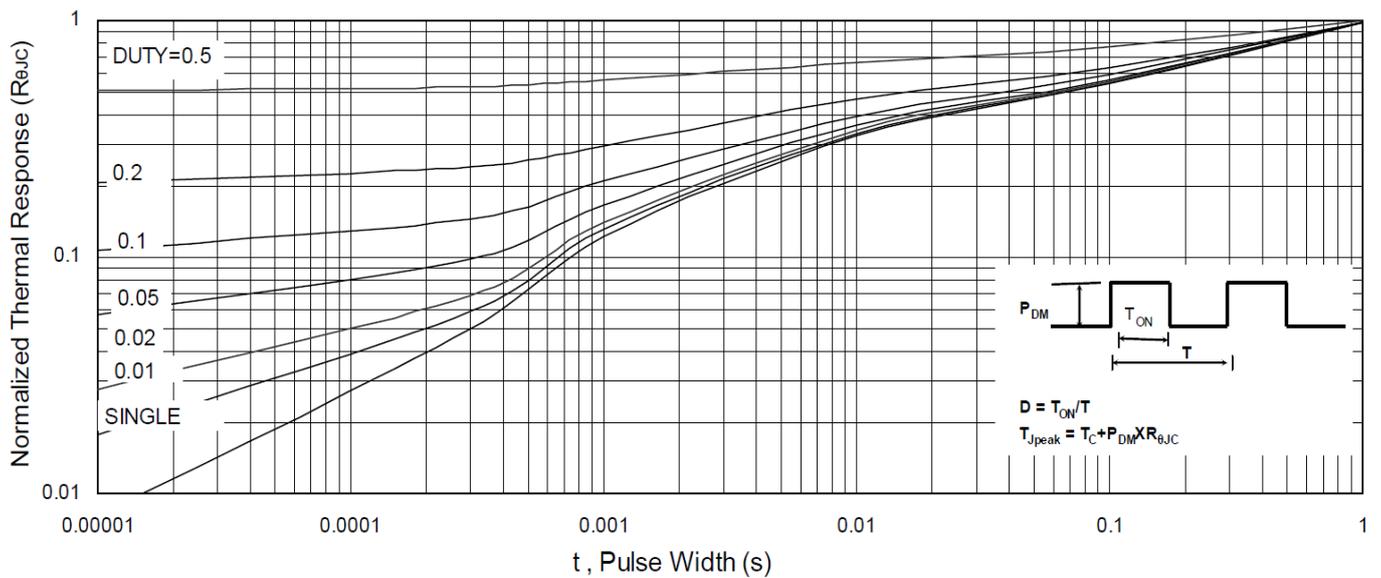
**Figure 7: Capacitance**



**Figure 8: Safe Operating Area**

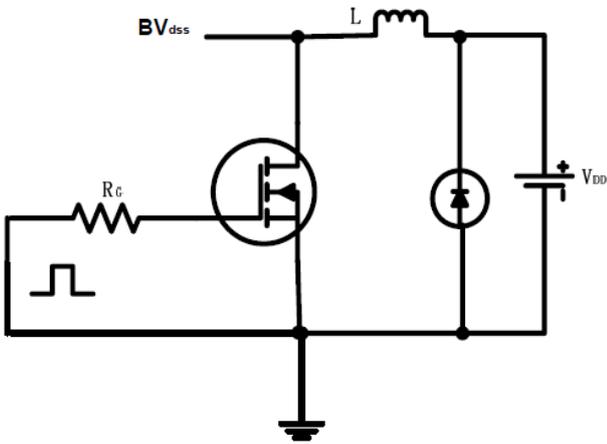


**Figure 9: Normalized Maximum Transient Thermal Impedance**

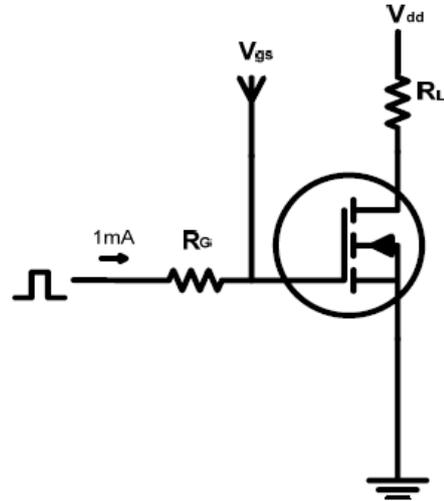


## Test circuits and Waveforms

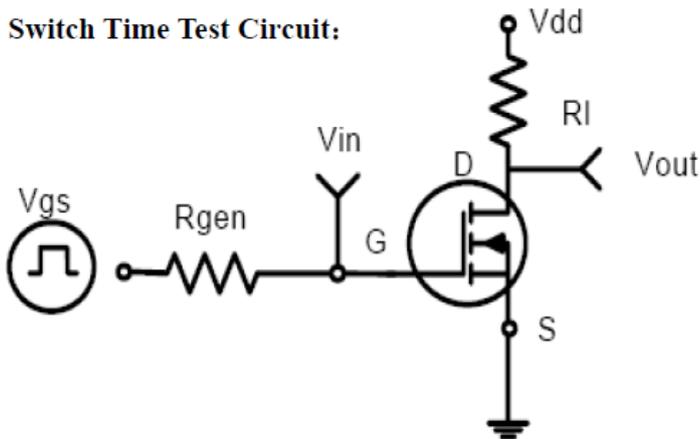
EAS test circuits:



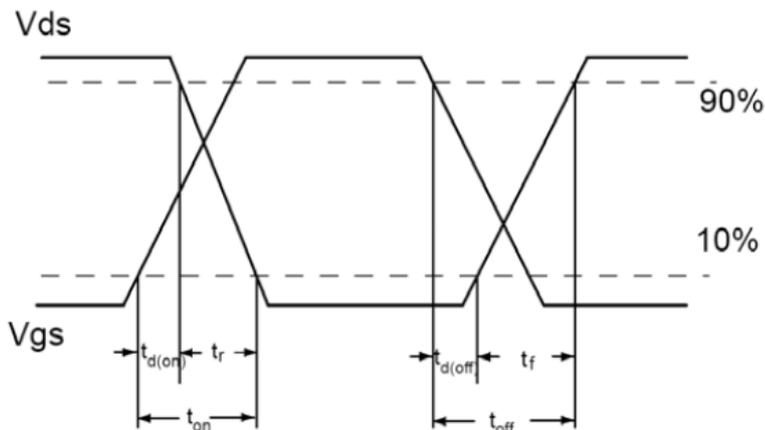
Gate charge test circuit:



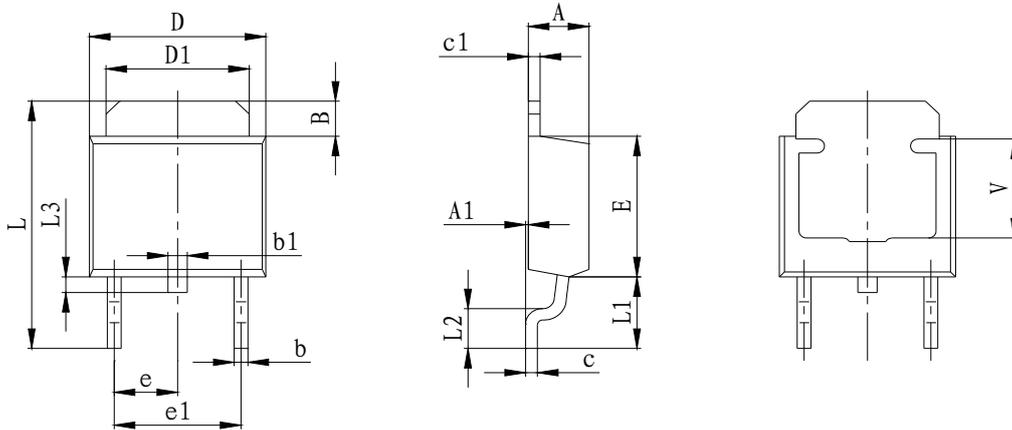
Switch Time Test Circuit:



Switch Waveforms:



**PACKAGE MECHANICAL DATA**  
**TO-252 Package Dimension**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	