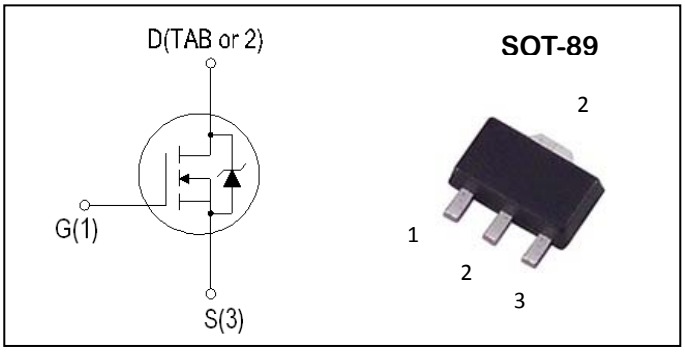
N-Channel Enhancement Mode Field Effect Transistor



PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ)
60V	4.6A	90mΩ

Absolute Maximum Ratings (T_A = 25°C unless otherwise specifed)

Symbol	Parameter		Ratings	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current（3）	TC=25°C	3	A
Mounted on Large Heat Sink				
I_{DM}	300μs Pulse Drain Current Tested(1)	T_C=25°C	18.4	A
I_D	Continuous Drain Current	T_C=25°C	4.6	A
		T_C=70°C	4	A
P_D	Maximum Power Dissipation	T_C=25°C	3	W
		T_C=70°C	2.5	W

1. Pulse width limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJA}	Thermal resistance junction-ambient max（3）	42	°C/W

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

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
On/off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250uA	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 60V, V_{GS}=0V	--	--	1	uA
		V_{DS}=60V, V_{GS}=0V T_J=55°C	--	--	10	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1	--	3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	--	--	±100	nA
$R_{DS(ON)}$	Drain-SourceOn-stateResistance(2)	V_{GS}= 10V, I_{DS}=3A	--	64	90	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V,	--	530	--	pF
C_{oss}	Output Capacitance	V_{DS}= 25V,	--	70	--	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	--	50	--	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time(1)	V_{DD}=30V,	--	9	18	ns
t_r	Turn-on Rise Time(1)	I_D= 1A, V_{GS}= 10V,	--	4	8	
$t_{d(OFF)}$	Turn-off Delay Time(1)	R_{GEN}=6Ω	--	28	56	
t_f	Turn-off Fall Time(1)		--	3	6	
Q_g	Total Gate Charge(1)	V_{DS}=30V, V_{GS}= 10V,	--	13	17	nC
Q_{gs}	Gate-Source Charge(1)	I_{DS}=4.5A	--	1	--	
Q_{gd}	Gate-Drain Charge(1)		--	4	--	
Diode Characteristics						
V_{SD}	Diode Forward Voltage(2)	I_{SD} = 3A, V_{GS} = 0	--	--	1	V

NOTES:

1. Independent of operating temperature.
2. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
3. Surface Mounted on FR4 Board, t < 10 sec.

Typical Performance Characteristics

Figure 1: Output Characteristics

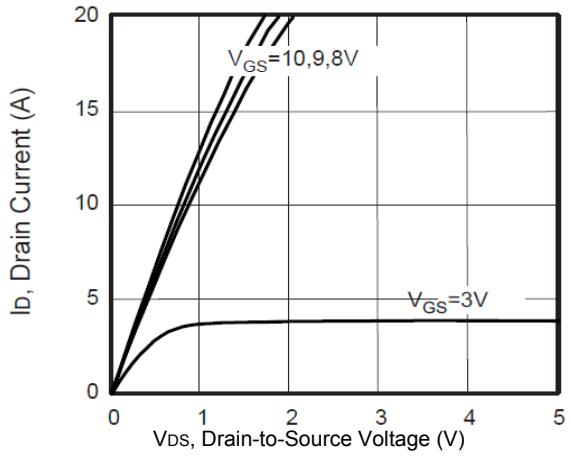


Figure 2: Transfer Characteristics

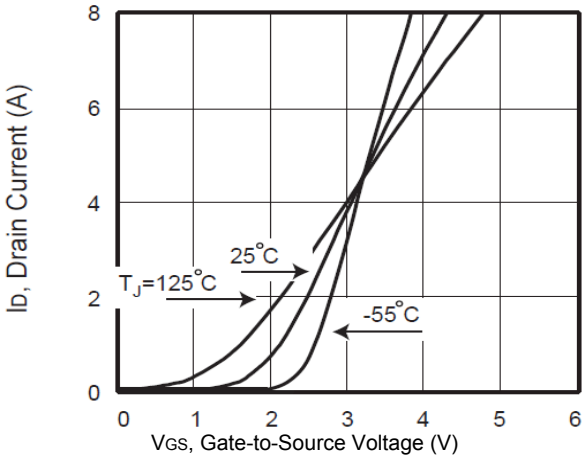


Figure 3: Gate Threshold Variation with Temperature

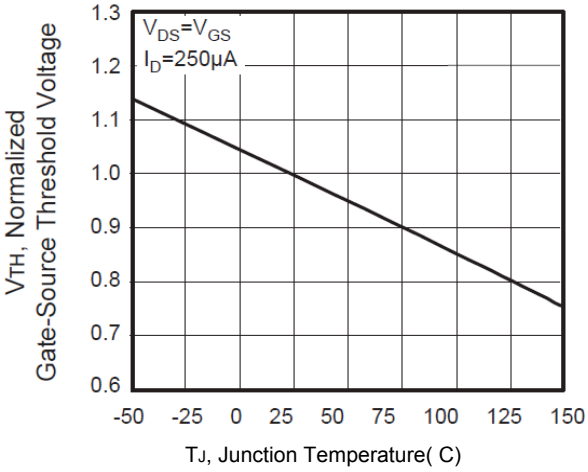


Figure 4: On-Resistance Variation with Temperature

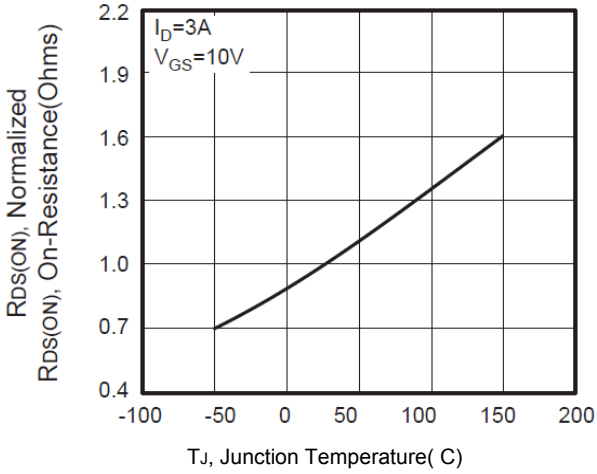


Figure 5: Capacitance Characteristics

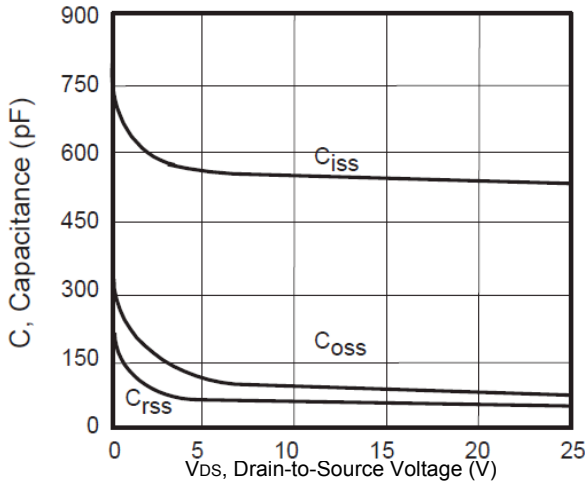


Figure 6: Body Diode Forward Voltage Variation with Source Current

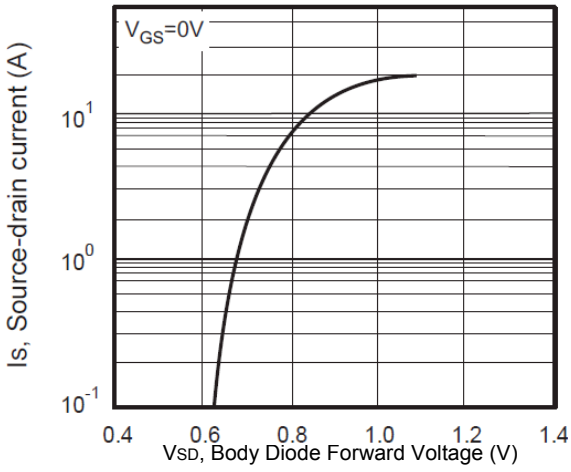


Figure 7: Gate Charge

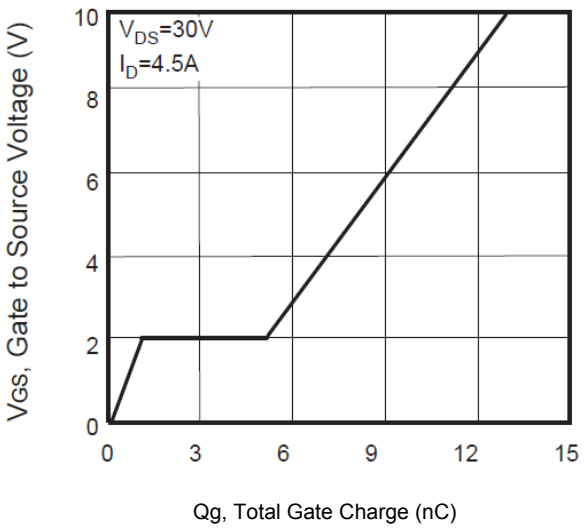


Figure 8: Maximum Safe Operating Area

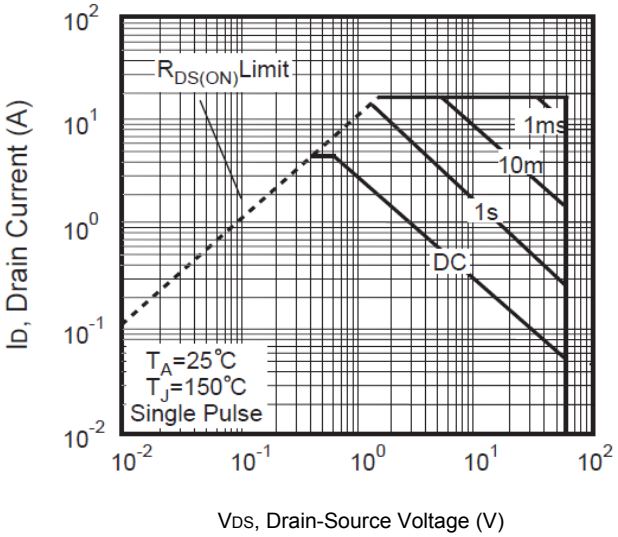
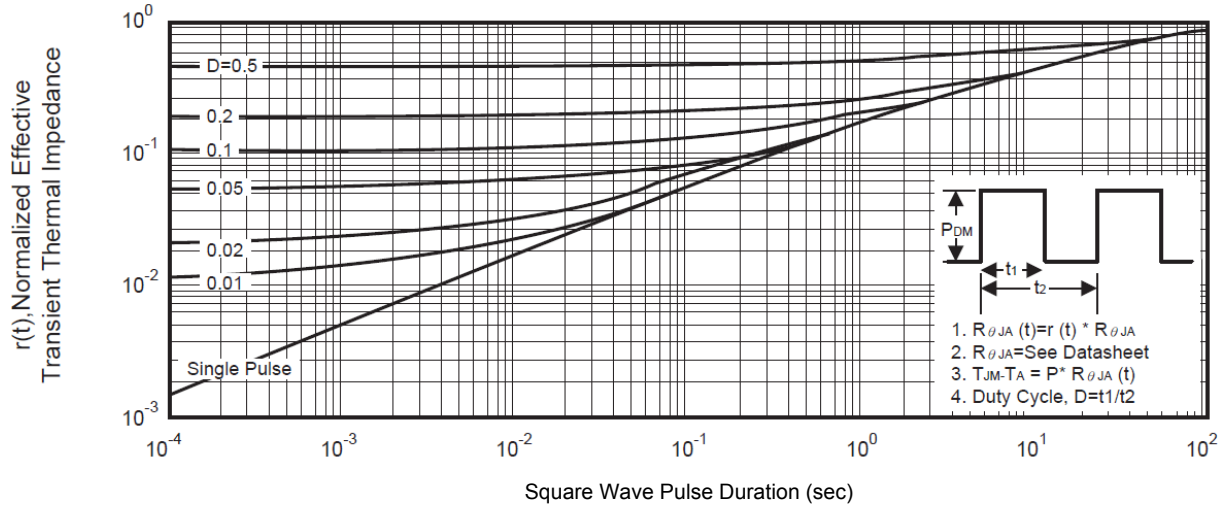
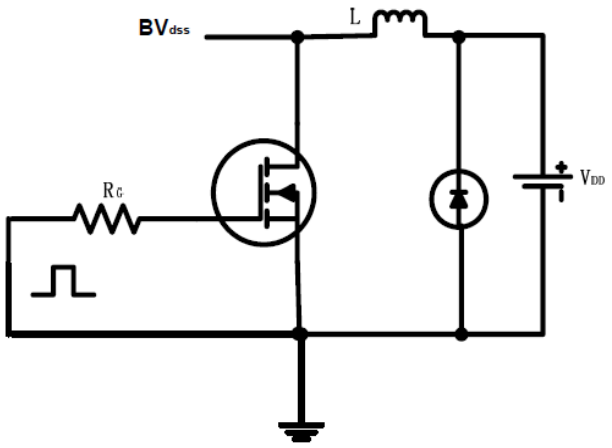


Figure 9: Transient Thermal Response Curve

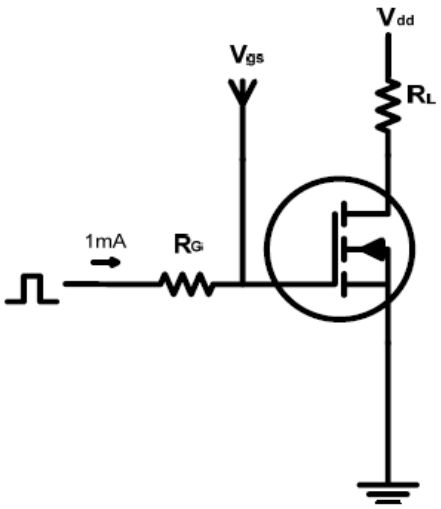


Test circuits and Waveforms

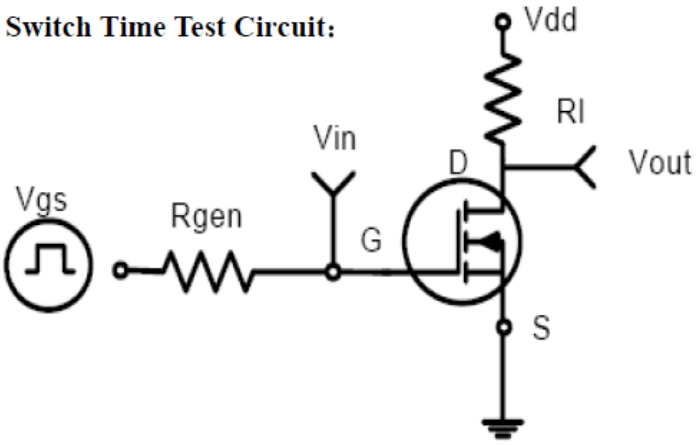
EAS test circuits:



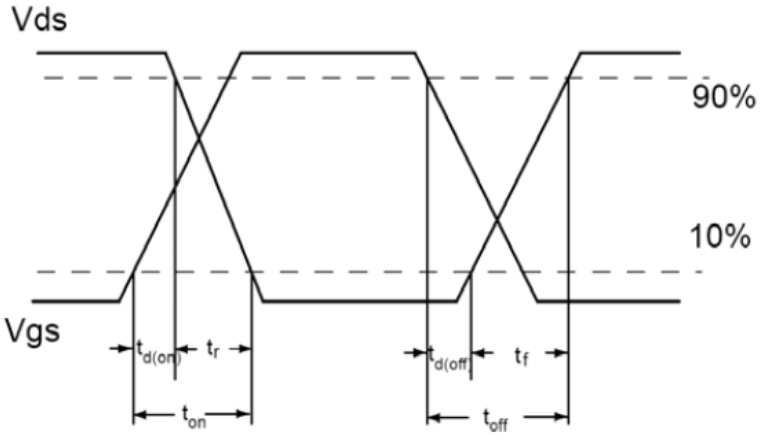
Gate charge test circuit:



Switch Time Test Circuit:

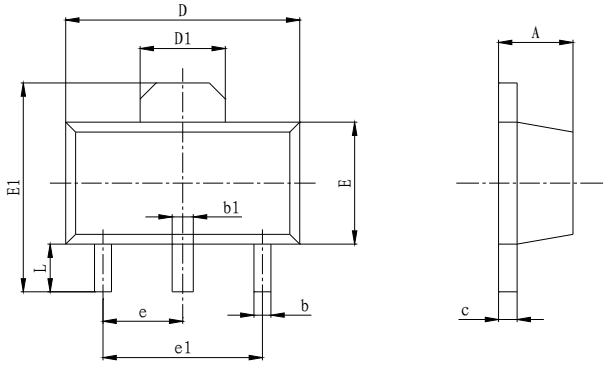


Switch Waveforms:



PACKAGE MECHANICAL DATA

SOT-89 Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.200	0.035	0.047