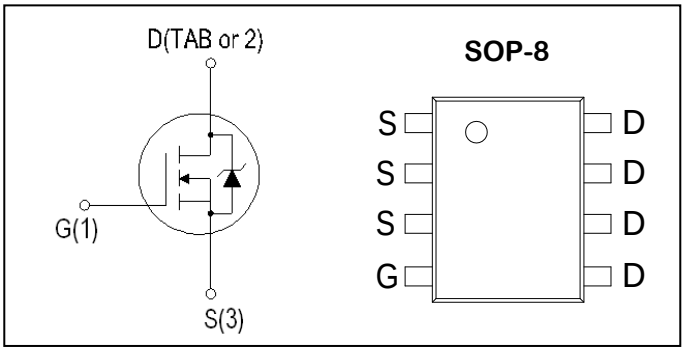
N-Channel Enhancement Mode Field Effect Transistor



PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ)
30V	12A	9.0mΩ

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

Symbol	Parameter		Ratings	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		30	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	TC=25°C	12	A
Mounted on Large Heat Sink				
I_{DM}	300μs Pulse Drain Current Tested(1)	T_C=25°C	42	A
I_D	Continuous Drain Current	T_C=25°C	12	A
P_D	Maximum Power Dissipation	T_C=25°C	1.5	W

1. Pulse width limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max	36	°C/W
R_{thJA}	Thermal resistance junction-ambient max	85	°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	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 24V, V_{GS}=0V	--	--	1	uA
		V_{DS}=24V, V_{GS}=0V T_J=55°C	--	--	5	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1.2	1.5	2.5	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}=10A	--	7.5	9.0	mΩ
g_{FS}	Forward transconductance(2)	V_{DS}= 5V, I_{DS}=10A	--	5.8	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V,	--	1317	1845	pF
C_{oss}	Output Capacitance	V_{DS}= 15V,	--	463	228.2	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	--	131	183.4	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time(1)	V_{DD}=15V,	--	6.2	12.4	ns
t_r	Turn-on Rise Time(1)	I_D= 10A, V_{GS}= 10V,	--	59	1.6	
$t_{d(OFF)}$	Turn-off Delay Time(1)	R_{GEN}=3.3Ω	--	27.6	55	
t_f	Turn-off Fall Time(1)		--	8.4	16.8	
Q_g	Total Gate Charge(1)	V_{DS}=20V, V_{GS}= 4.5V,	--	12.6	17.6	nC
Q_{gs}	Gate-Source Charge(1)	I_{DS}=10A	--	4.2	5.9	
Q_{gd}	Gate-Drain Charge(1)		--	5.1	7.1	
Diode Characteristics						
V_{SD}	Diode Forward Voltage(2)	I_{SD} = 1A, V_{GS} = 0	--	--	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=30A, dI_{SD}/dt=100A/μs	--	12.5	--	ns
q_{rr}	Reverse Recovery Charge		--	5	--	nC

NOTES:

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

Typical Performance Characteristics

Figure 1: On-Region Characteristics

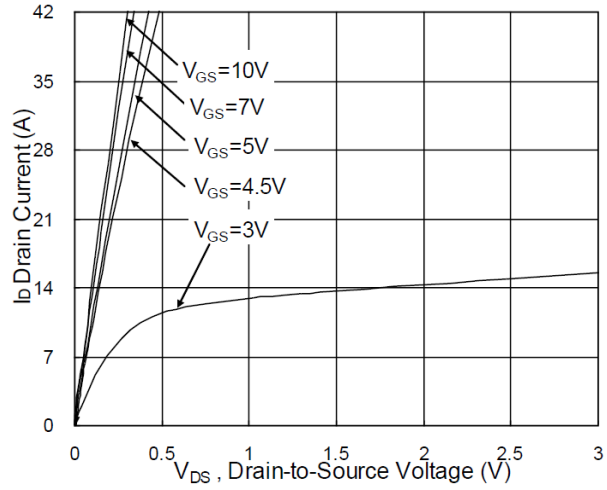


Figure 2: On-Resistance vs. G-S Voltage

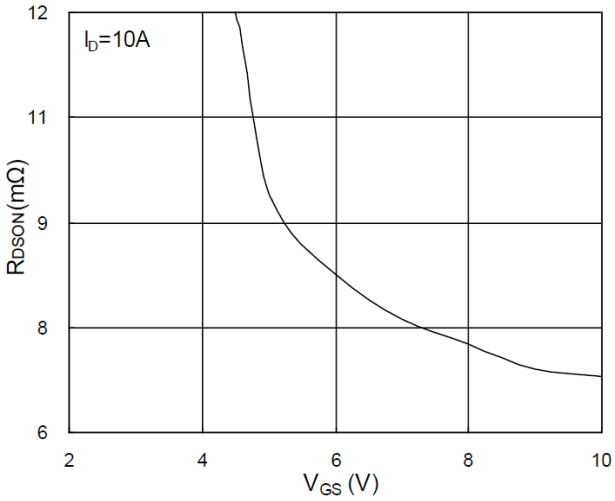


Figure 3: Forward Characteristics of Reverse

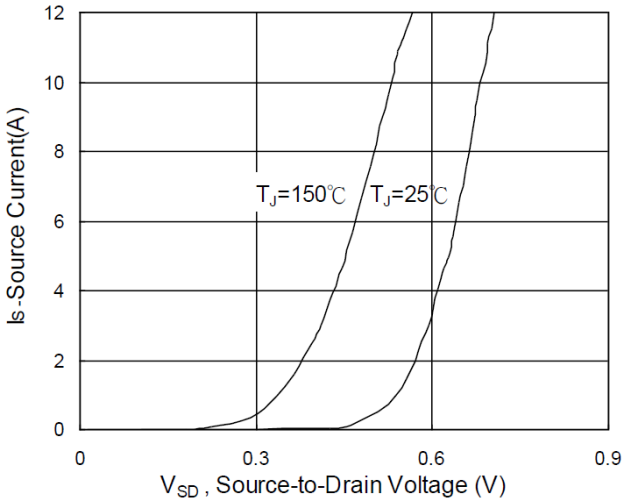


Figure 4: Normalized $V_{GS(th)}$ vs. T_J

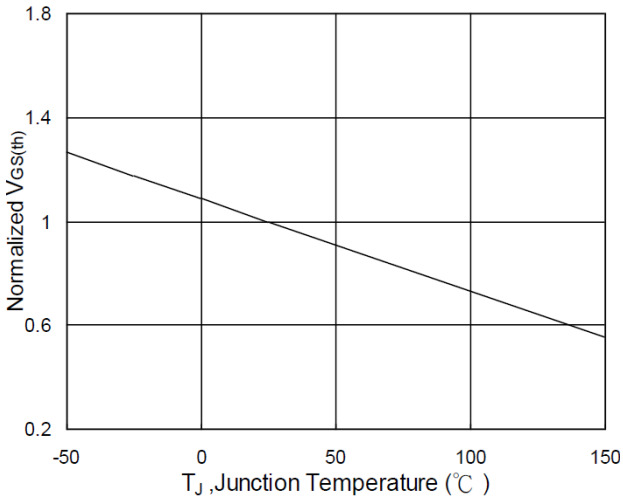


Figure 5: Normalized R_{DSON} vs. T_J

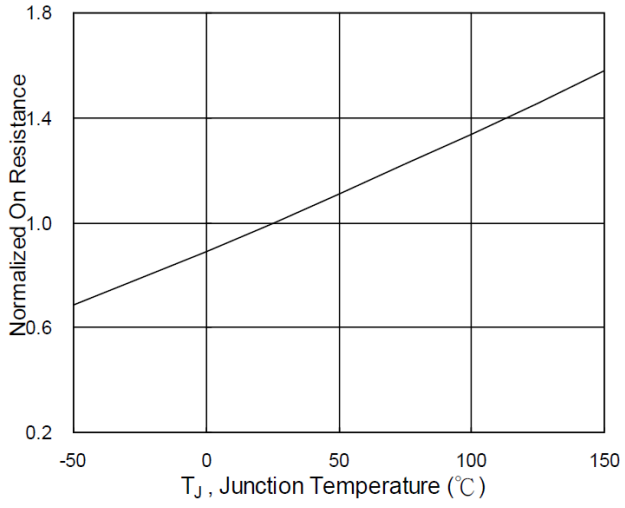


Figure 6: Gate Charge Characteristics

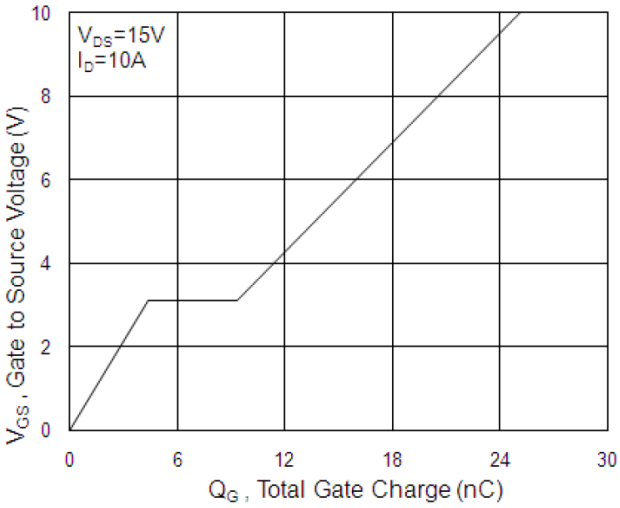


Figure 7: Capacitance

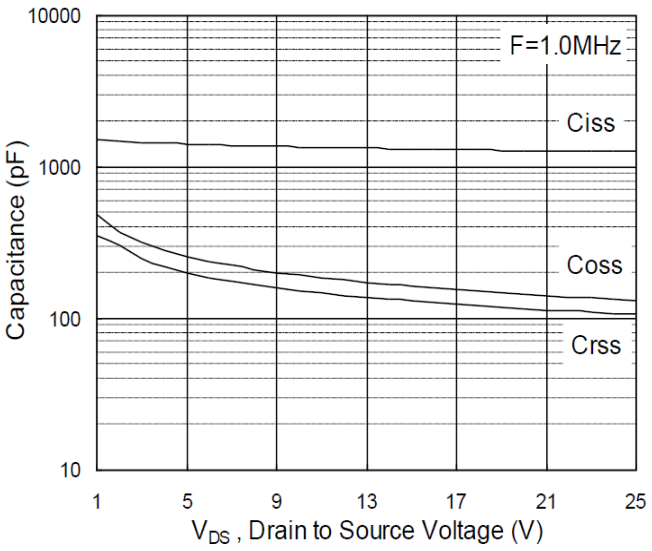


Figure 8: Safe Operating Area

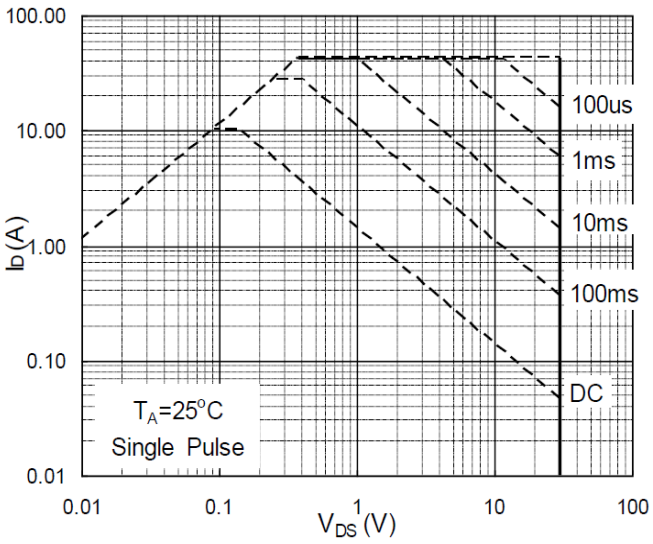
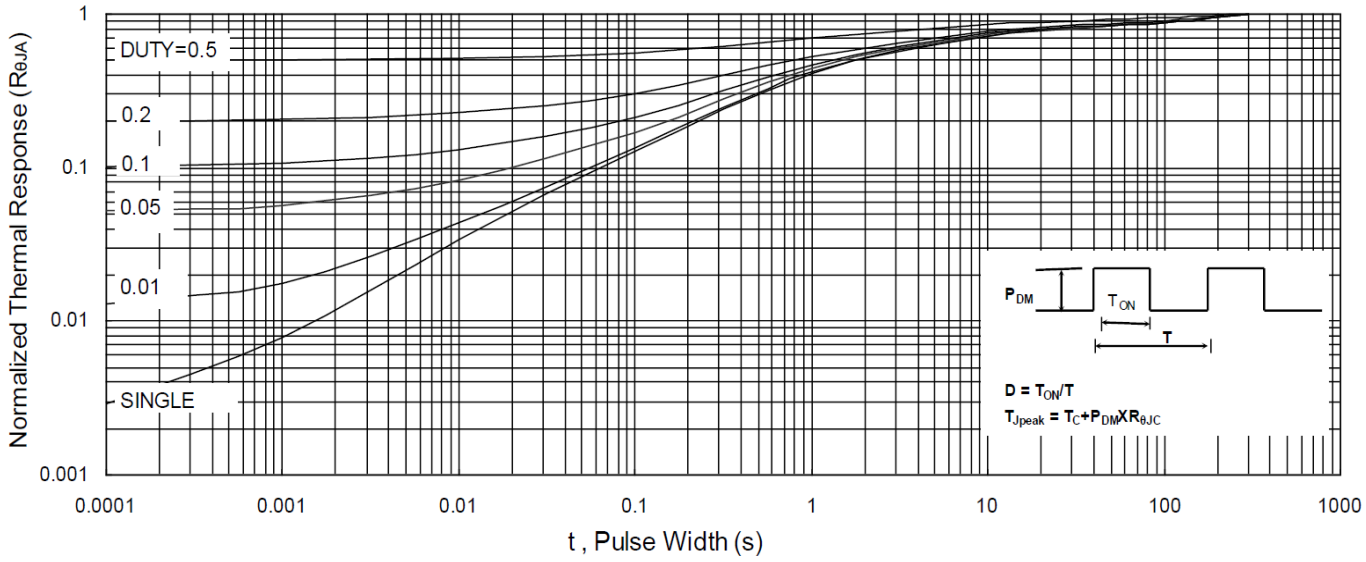
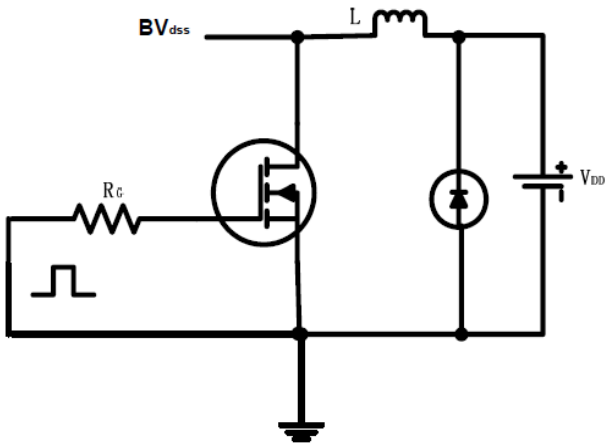


Figure 9: Normalized Maximum Transient Thermal Impedance

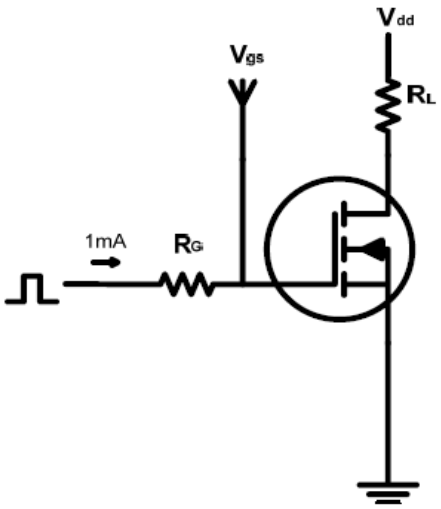


Test circuits and Waveforms

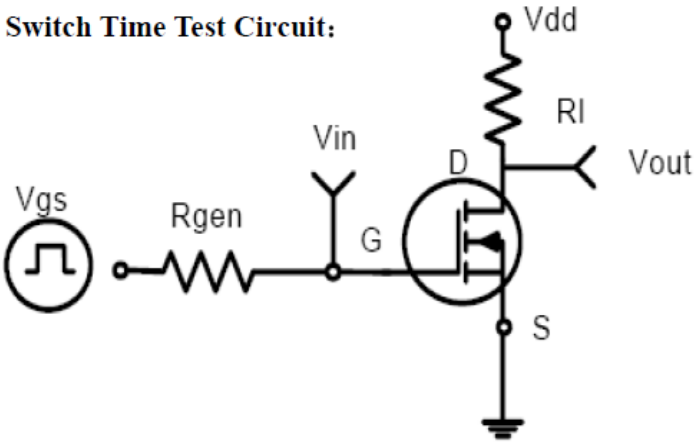
EAS test circuits:



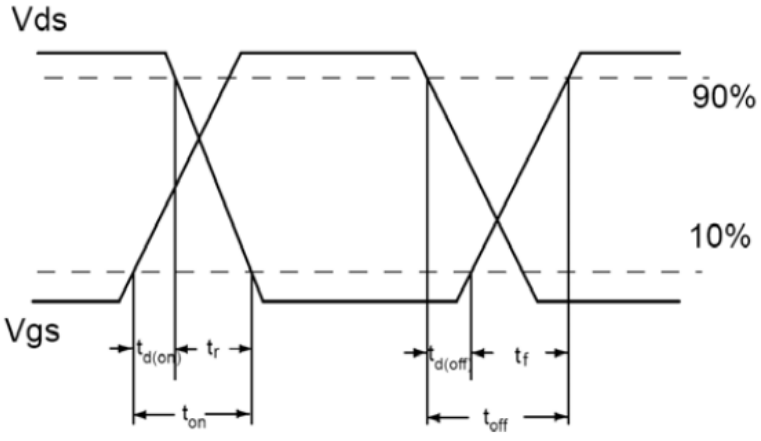
Gate charge test circuit:



Switch Time Test Circuit:

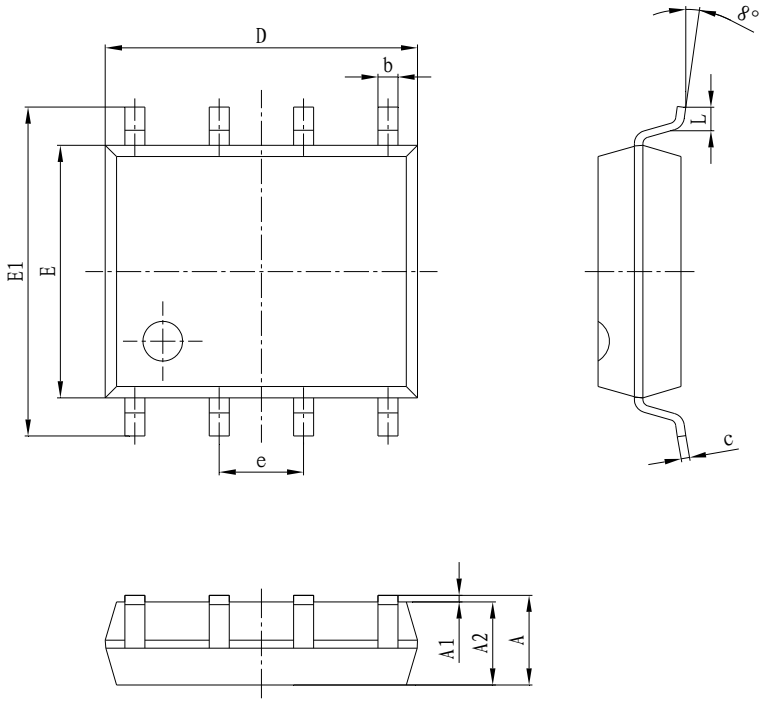


Switch Waveforms:



PACKAGE MECHANICAL DATA

SOP-8 Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E1	5.800	6.200	0.228	0.244
E	3.800	4.000	0.150	0.157
e	1.270TYP		0.050TYP	
e1	4.500	4.700	0.177	0.185
L	0.400	1.270	0.016	0.050