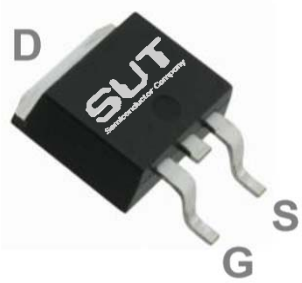
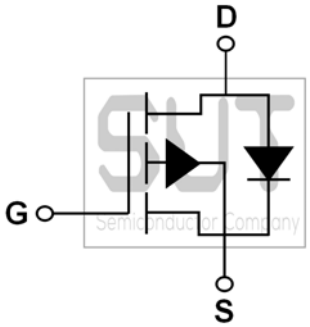
Version 1.0 Date 2019.03.27 Datasheet

P-Channel 60-$V_{(D-S)}$ MOSFET

PRODUCT SUMMARY		
B_{VDSS}(V)	$R_{DS(on)}$ (mΩ)(MAX)	I_D(A)
-60	105@V_{GS}=-10V	-10

TO252 Pin Configuration





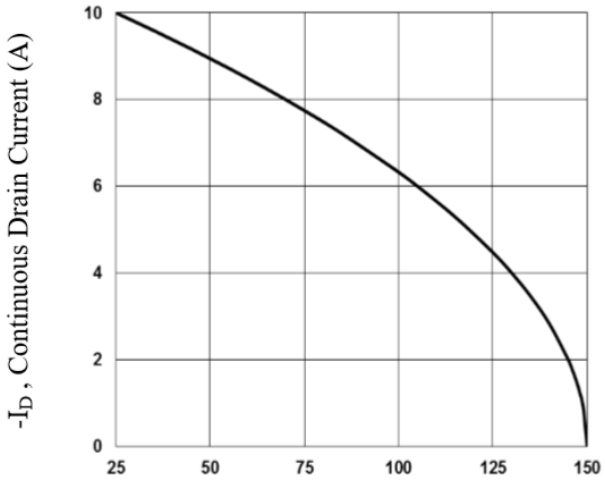
ABSOLUTE MAXIMUM RATINGS(T_C=25℃ UNLESS OTHERWISE NOTED)			
Parameter	**Symbol**	**Rating**	**Units**
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_C=25℃)	I_D	-10	A
Drain Current-Continuous (T_C=100℃)		-6.3	A
Drain Current-Pulsed[1]	I_{DM}	-40	A
Single Pulse Avalanche Energy[2]	EAS	25	mJ
Single Pulse Avalanche Current[2]	IAS	-18	A
Power Dissipation (T_C=25℃)	P_D	32	W
Power Dissipation-Derate above 25℃		0.25	W/℃
Storage Temperature Range	T_{STG}	-50 to 150	℃
Operating Junction Temperature Range	T_J	-50 to 150	℃

THERMAL CHARACTERISTICS				
Parameter	**Symbol**	**Typ.**	**Max.**	**Unit**
Thermal Resistance Junction to ambient	$R_{\theta JA}$	---	62	℃/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	3.84	℃/W

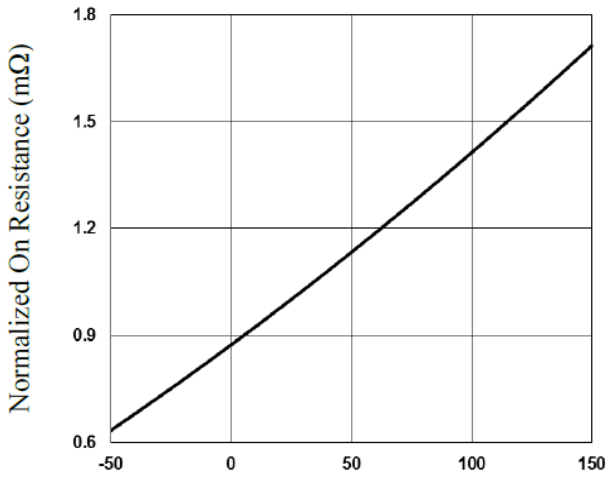
ELECTRICAL CHARACTERISTICS (T_J=25℃ UNLESS OTHERWISE NOTED)						
Parameter	**Symbol**	**Test Condition**	**Min.**	**Typ.**	**Max.**	**Unit**
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=-250uA	-60	---	---	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25℃,I_D=-1mA	---	-0.05	---	V/℃
Drain-Source Leakage Current	I_{DSS}	V_{GS}=0V,V_{DS}=-60V,T_J=25℃	---	---	-1	uA
		V_{GS}=0V,V_{DS}=-48V,T_J=125℃	---	---	-10	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V , I_D=-6A	---	87	105	mΩ
		V_{GS}=-4.5V , I_D=-3A	---	120	145	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =-250uA	-1.0	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	3.0	---	mV/℃
Forward Transconductance	gfs	V_{DS}=-10V , I_D=-6A	---	5.5	---	S
Dynamic and Switching Characteristics						
Total Gate Charge[3 , 4]	Q_g	V_{GS}=-10V , V_{DS}=-30V , I_D=-4A	---	10	15	nC
Gate-Source Charge[3 , 4]	Q_{gs}		---	1.6	3.2	
Gate-Drain Charge[3 , 4]	Q_{gd}		---	3.0	6.0	
Turn-On Delay Time[3 , 4]	$T_{d(on)}$	V_{GS}=-10V , V_{DD}=-30V , R_G=6Ω , I_D=-1A	---	8.0	16	ns
Rise Time[3 , 4]	T_r		---	15.4	30	
Turn-Off Delay Time[3 , 4]	$T_{d(off)}$		---	42.8	80	
Fall Time[3 , 4]	T_f		---	8.4	16	
Input Capacitance	C_{iss}	V_{GS}=0V , V_{DS}=-30V , F=1MHz	---	785	1300	pF
Output Capacitance	C_{oss}		---	175	300	
Reverse Transfer Capacitance	C_{rss}		---	112	220	
Gate resistance	R_g	V_{GS}=0V,V_{DS}=0V,F=1MHz	---	36	---	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V,Force Current	---	---	-10	A
Pulsed Source Current	I_{SM}		---	---	-20	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V , I_S=-1A ,T_J=25℃	---	---	-1.0	V

Note :

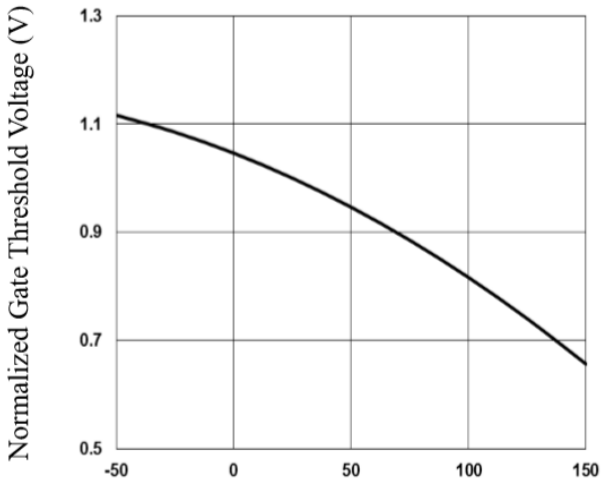
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{GS}=-10V , V_{DD}=-25V , L=0.1mH , I_{AS}=-18A , R_G=25Ω , Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.



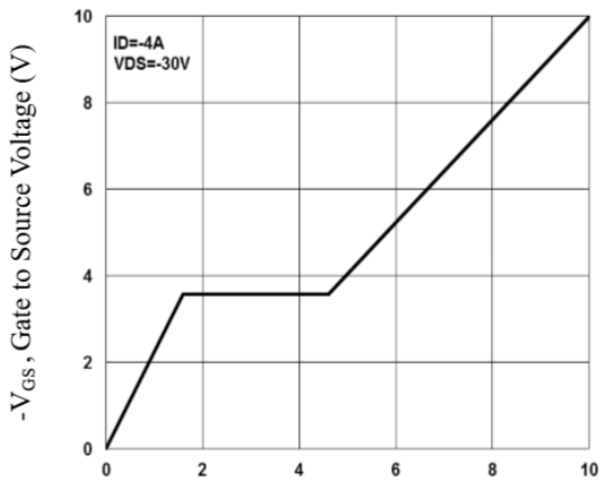
Continuous Drain Current vs. T_C



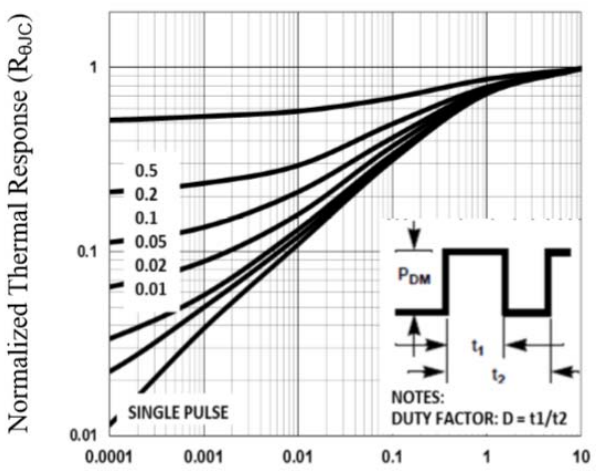
Normalized $R_{DS(ON)}$ vs. T_J



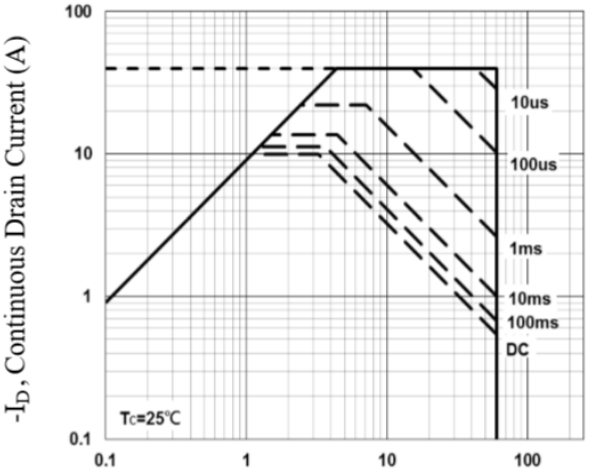
Normalized V_{th} vs. T_J



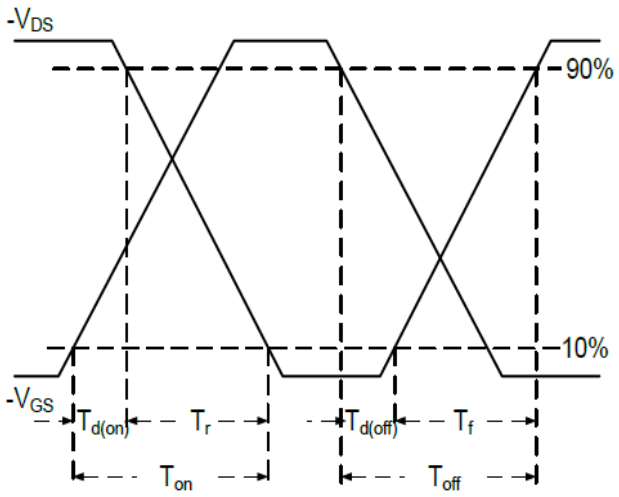
Gate Charge Waveform



Normalized Transient Impedance

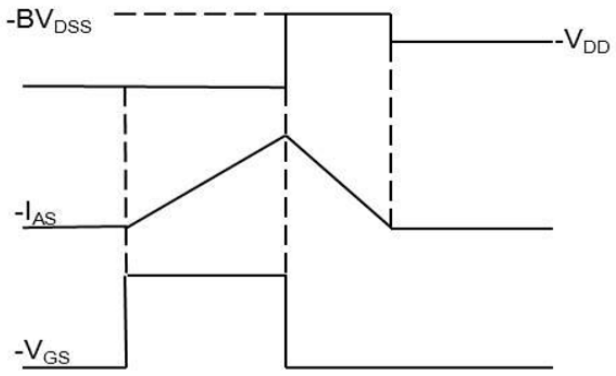


Maximum Safe Operation Area



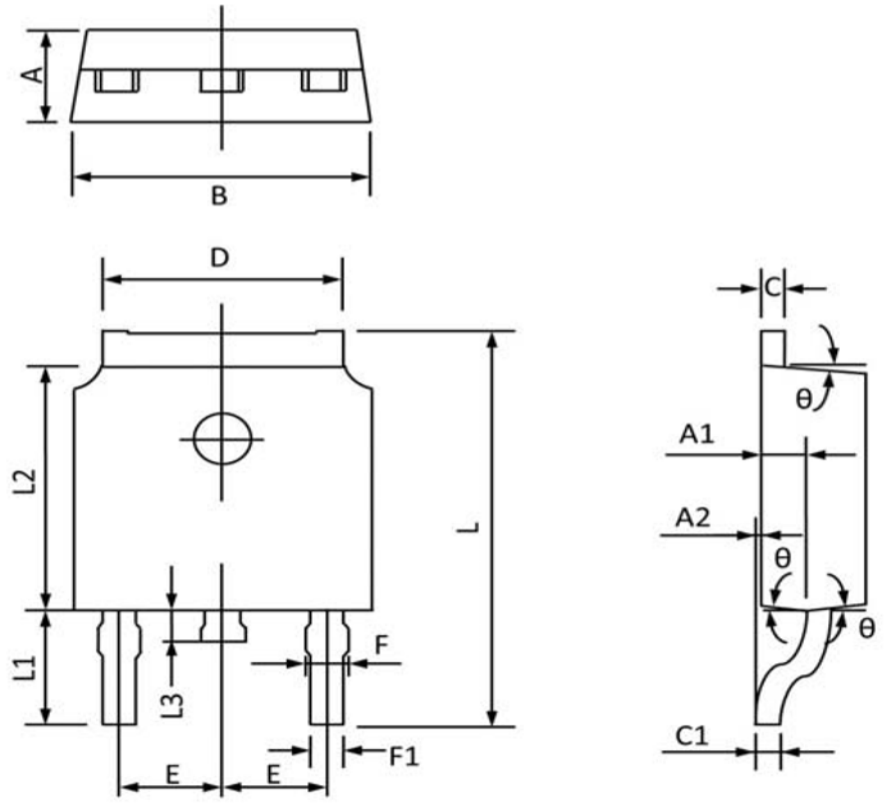
Switching Time Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS})^2 \times \frac{-BVDSS}{-BVDSS-(-VDD)}$$



EAS Waveform

TO252 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	2.400	2.200	0.094	0.087
A1	1.110	0.910	0.044	0.036
A2	0.150	0.000	0.006	0.000
B	6.800	6.400	0.268	0.252
C	0.580	0.450	0.023	0.018
C1	0.580	0.460	0.023	0.018
D	5.500	5.100	0.217	0.201
E	2.386	2.186	0.094	0.086
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	5.400	0.244	0.213
L3	1.200	0.600	0.047	0.024
θ	9°	3°	9°	3°