P-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY

BV_{DSS}	-40V
$R_{DSON(MAX.)}$	0.015Ω
I_D	-50A

FEATURES

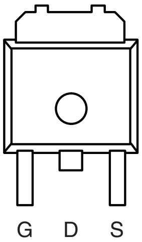
- TrenchFET Power MOSFET
- 100 % R_g and UIS Tested

RoHS
COMPLIANT
HALOGEN
FREE

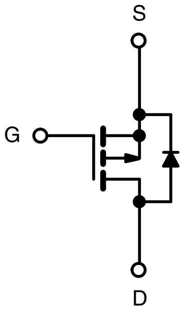
APPLICATIONS

- Power Switch
- Load Switch in High Current Applications
- DC/DC Converters

TO-252



Top View



P-Channel MOSFET

Absolute Maximum Ratings(T_C = 25 °C, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current@10V	T_C = 25 °C	I_D	-50	A
	T_C = 100 °C		-31	
Pulsed Drain Current		I_{DM}	-200	A
Single Pulse Avalanche Energy	L = 0.1 mH	E_{AS}	80	mJ
Total Power Dissipation	T_C = 25 °C	P_D	55	W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	LIMIT.	Unit
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	61	°C / W
Thermal resistance, junction-to-case	$R_{\theta JC}$	2.27	

Electrical Characteristics T_J = 25°C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V , I_D = - 250 μA	-40	-	-	V
Gate-body Leakage current	I_{GSS}	V_{DS} = 0 V , V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 40 V , V_{GS} = 0 V , T_J = 25 °C	-	-	1	μA
		V_{DS} = - 40 V , V_{GS} = 0 V , T_J = 100 °C	-	-	5	
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250 μA	-1		-2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = - 10 V , I_D = - 16 A	-	0.0115	0.015	Ω
		V_{GS} = - 4.5 V , I_D = - 12 A	-	0.016	0.020	
Forward Transconductance	g_{fs}	V_{DS} = - 10 V , I_D = - 16 A	-	9	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = - 20 V , V_{GS} = 0 V , f = 1 MHz	-	3052	-	pF
Output Capacitance	C_{oss}		-	284	-	
Reverse Transfer Capacitance	C_{rss}		-	232	-	
Switching Characteristics						
Gate Resistance	R_g	f = 1 MHz	-	9	-	Ω
Total Gate Charge	Q_g	V_{DS} = - 20 V , V_{GS} = - 10 V , I_D = - 16 A	-	30	-	nC
Gate-Source Charge	Q_{gs}		-	10	-	
Gate-Drain Charge	Q_{gd}		-	8.7	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 15 V , I_D ≅ - 16 A , V_{GEN} = - 10 V , R_G = 3 Ω	-	40	-	nS
Rise Time	t_r		-	33	-	
Turn-Off Delay Time	$t_{d(off)}$		-	92	-	
Fall Time	t_f		-	9.4	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	V_{SD}	I_S = - 1 A , V_{GS} = 0 V	-	-	-1.2	V
Continuous Source-Dranin Diode Current	I_S	T_J = 25 °C	-	-	-50	A

Notes：

a. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C

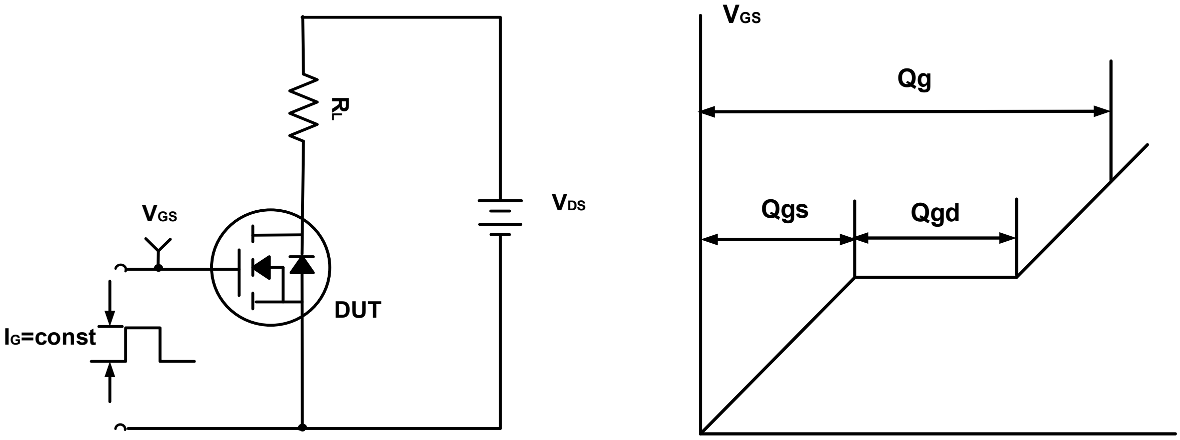
b. The E_{AS} data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.1mH,I_{AS}= -40A.

c. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper,The value in any given application depends on the user's specific board design.

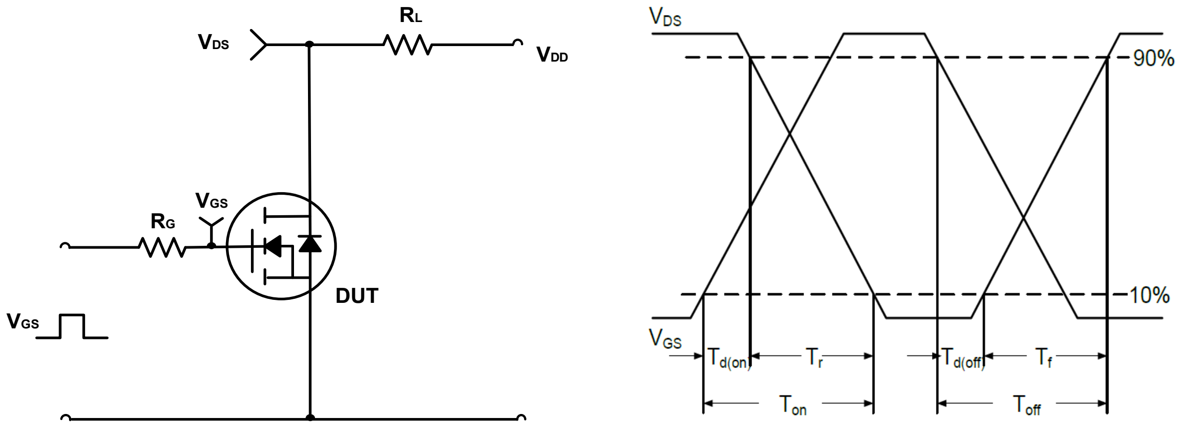
d. The data tested by pulsed , pulse width ≤300us , duty cycle ≤2%.

e. This value is guaranteed by design hence it is not included in the production test.

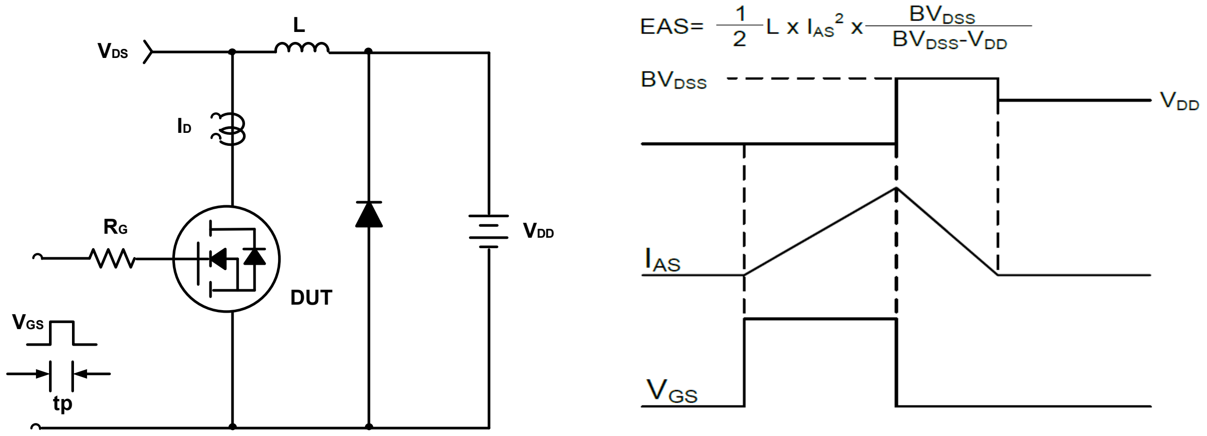
Test circuit and Waveform



Gate Charge Test Circuit & Waveforms

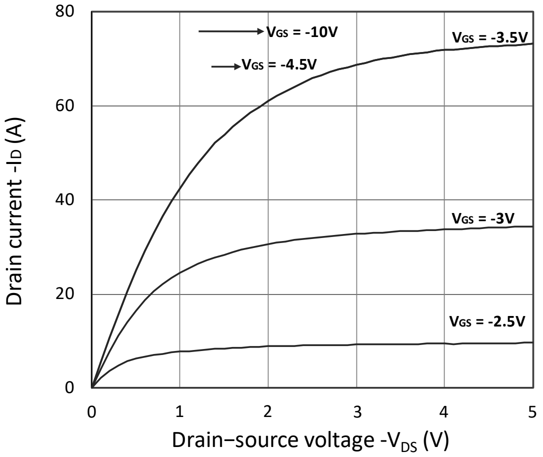


Switching Test Circuit & Waveforms

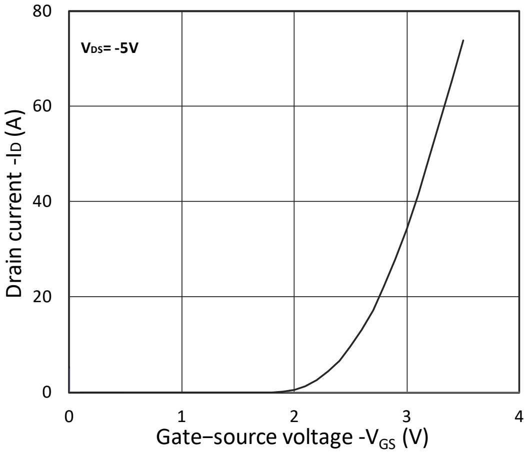


Unclamped Inductive Switching Circuit & Waveforms

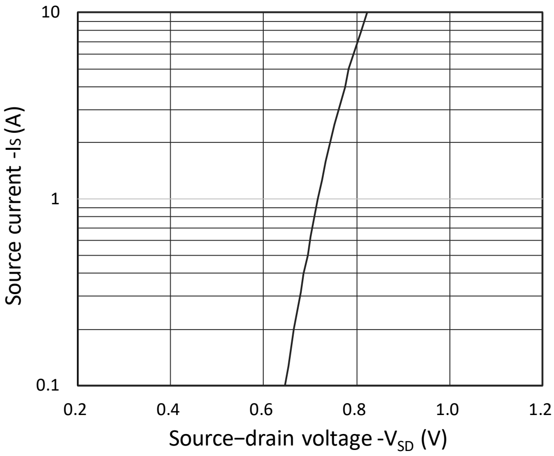
TYPICAL CHARACTERISTICS (25 °C unless noted)



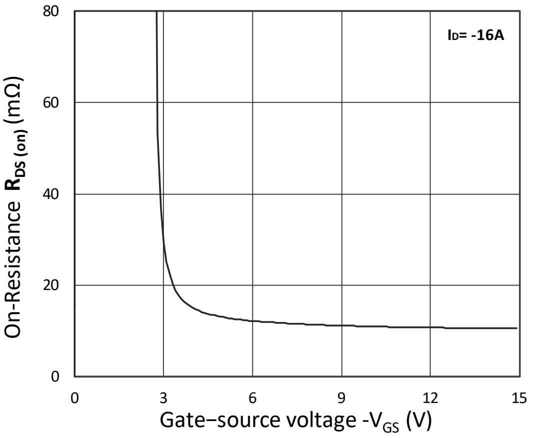
Output Characteristics



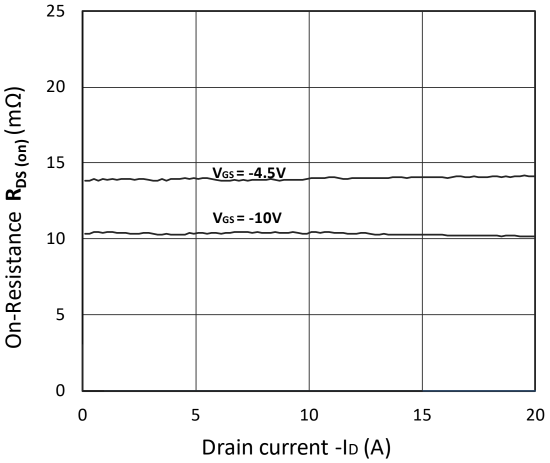
Transfer Characteristics



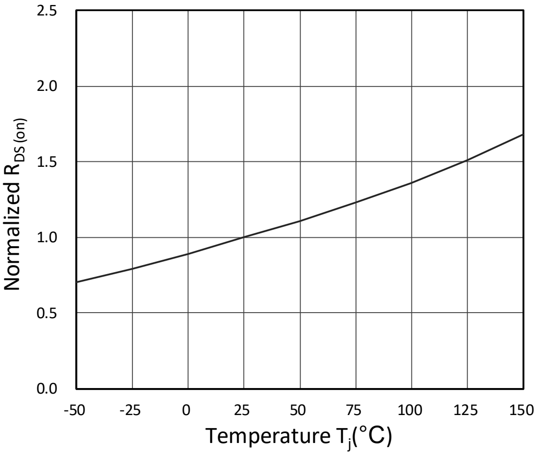
Forward Characteristics of Reverse



$R_{DS(ON)}$ vs. V_{GS}

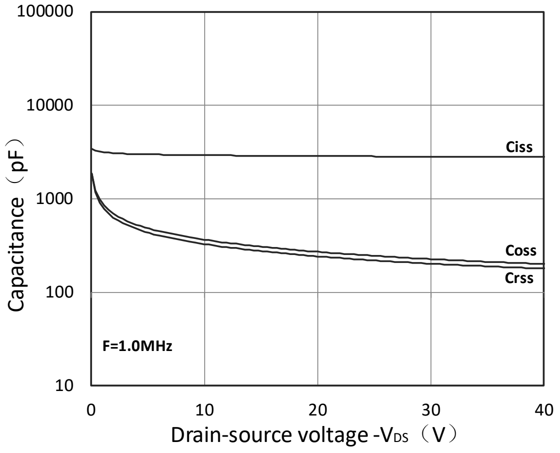


$R_{DS(ON)}$ vs. I_D

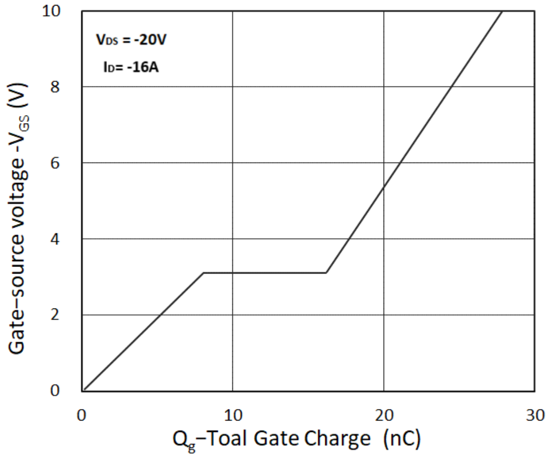


Normalized $R_{DS(on)}$ vs. Temperature

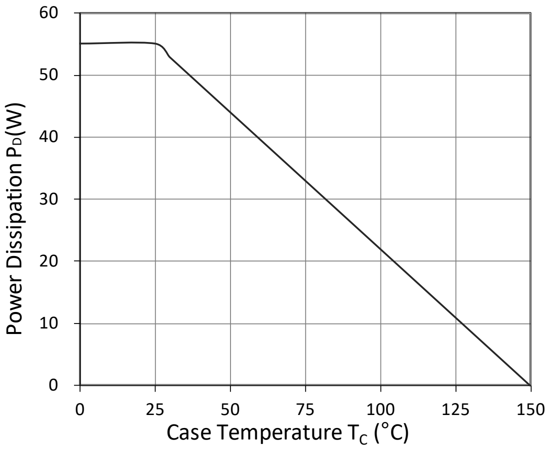
TYPICAL CHARACTERISTICS (25 °C unless noted)



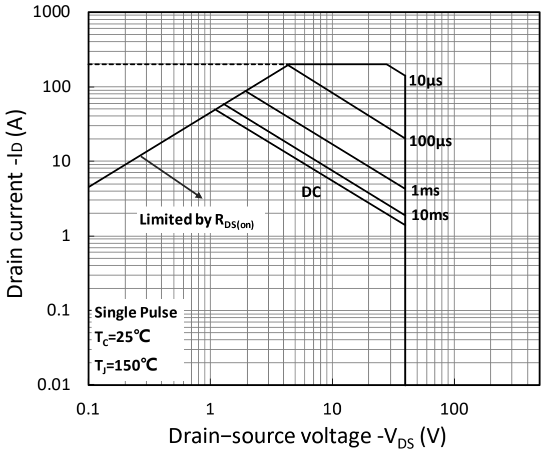
Capacitance Characteristics



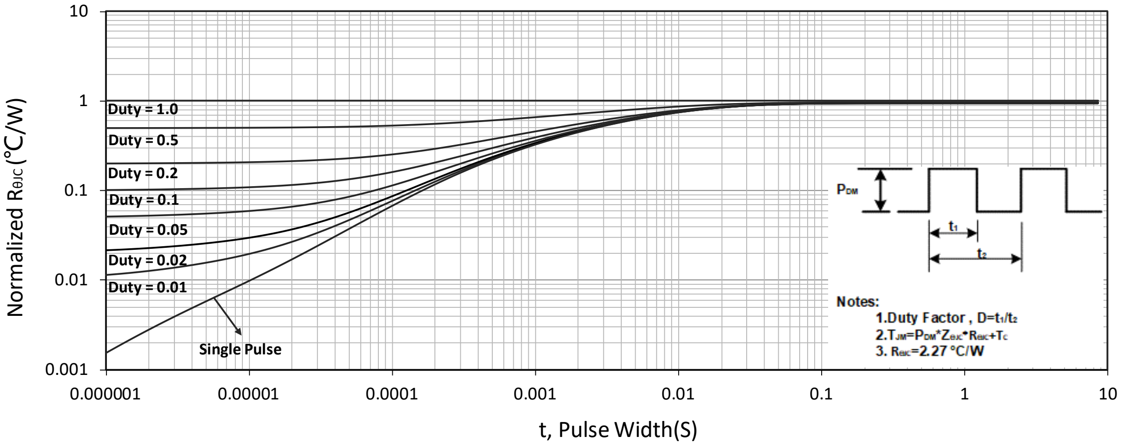
Gate Charge Characteristics



Power Dissipation



Safe Operating Area



Notes:

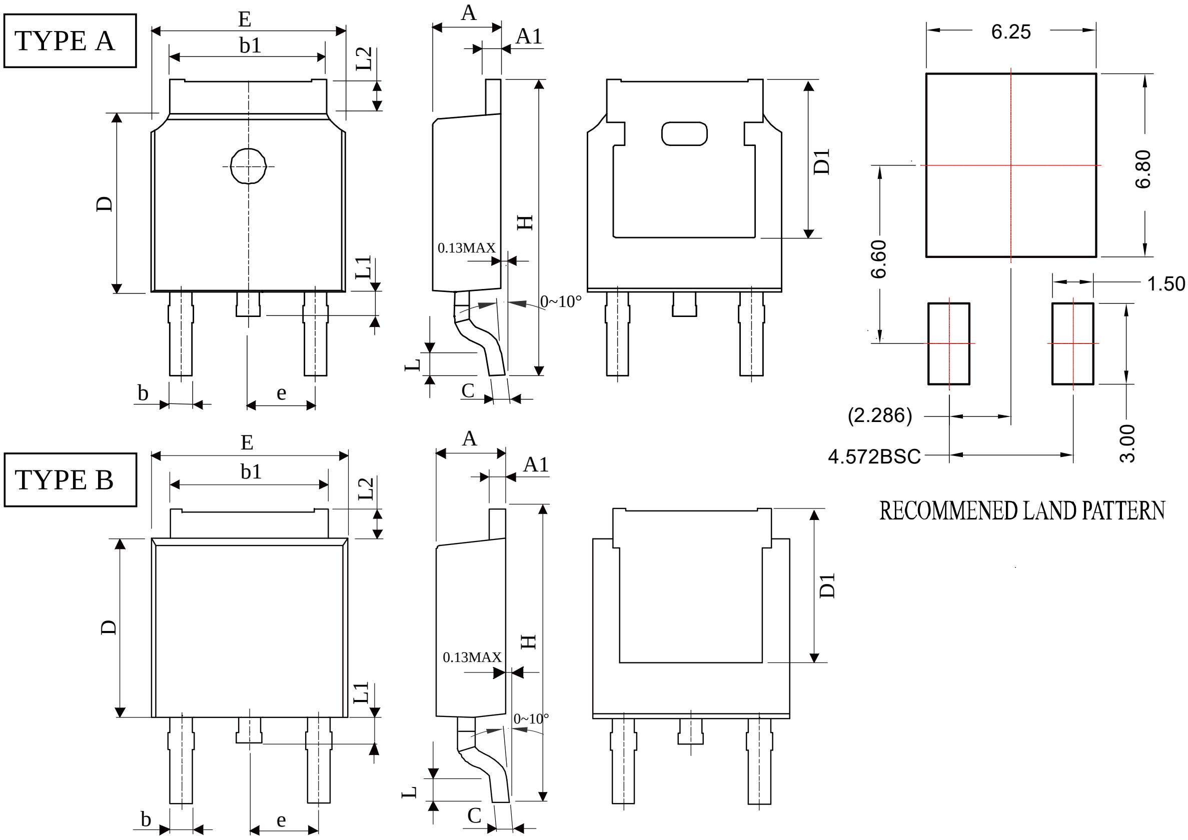
1.Duty Factor , $D=t_1/t_2$

2.$T_{JM}=P_{DM}*Z_{\theta JC}*R_{\theta JC}+T_C$

3. $R_{\theta JC}$=2.27 °C/W

Normalized Maximum Transient Thermal Impedance

TO-252 _ PACKGE OUTLIN



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.20	2.40	0.087	0.094
A1	0.45	0.89	0.018	0.035
b	0.50	0.90	0.019	0.035
b1	4.95	5.59	0.195	0.220
C	0.40	0.61	0.016	0.024
D	5.40	6.63	0.213	0.261
E	6.05	7.10	0.238	0.280
e	1.98	2.59	0.078	0.102
H	8.80	10.6	0.346	0.417
L	0.25	1.350	0.010	0.053
L1	0.50	1.20	0.020	0.047
L2	0.70	1.78	0.028	0.070
D1	5.00	5.60	0.197	0.220