N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY

BV_{DSS}	30V
$R_{DSON(MAX.)}$	0.0028Ω
I_D	150A

FEATURES

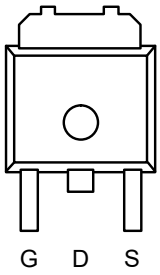
- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested
- Low Thermal Resistance Package

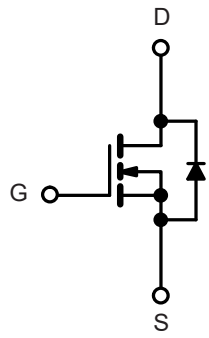
RoHS COMPLIANT

APPLICATIONS

- OR-ing
- Server
- DC/DC

TO-252





N-Channel MOSFET

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current@10V	T_C = 25 °C	I_D	150	A
	T_C = 100 °C		80	
Pulsed Drain Current		I_{DM}	450	A
Single Pulse Avalanche Energy	L = 0.1 mH	E_{AS}	580	mJ
Avalanche Current		I_{AS}	60	A
Total Power Dissipation	T_C = 25 °C	P_D	59.5	W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	TYP.	MAX.	Unit
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	-	62	°C / W
Thermal resistance, junction-to-case	$R_{\theta JC}$	-	2.1	

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	30	-	-	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} = 30 V , V_{GS} = 0 V , T_J = 25 °C	-	-	1	μA
		V_{DS} = 24 V , V_{GS} = 0 V , T_J = 125 °C	-	-	50	
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250 μA	1.0		3.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10 V , I_D = 30 A	-	0.0021	0.0028	Ω
		V_{GS} = 4.5 V , I_D = 30 A	-	0.003	0.0036	
Forward Transconductance	g_{fs}	V_{DS} = 5 V , I_D = 30 A	-	73	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 15 V , V_{GS} = 0 V , f = 1 MHz	-	6279	-	pF
Output Capacitance	C_{oss}		-	1024	-	
Reverse Transfer Capacitance	C_{rss}		-	720	-	
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 24 V , V_{GS} = 10 V , I_D = 30 A	-	145	-	nC
Gate-Source Charge	Q_{gs}		-	19	-	
Gate-Drain Charge	Q_{gd}		-	45	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V , I_D ≅ 30 A , V_{GEN} = 10 V , R_G = 4.7 Ω	-	22	-	nS
Rise Time	t_r		-	60	-	
Turn-Off Delay Time	$t_{d(off)}$		-	160	-	
Fall Time	t_f		-	79	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	V_{SD}	I_S = 45 A , V_{GS} = 0 V	-	-	1.4	V
Continuous Source-Dranin Diode Current	I_S	T_J = 25 °C	-	-	110	A
Continuous Source Current	I_{SM}		-	-	440	A
Reverse Recovery Charge	Q_{rr}	T_J = 25 °C , I_F = 30 A , dI/dt = 100 A/μs	-	12	-	nC
Reverse Recovery Time	t_{rr}		-	28	-	ns

Notes

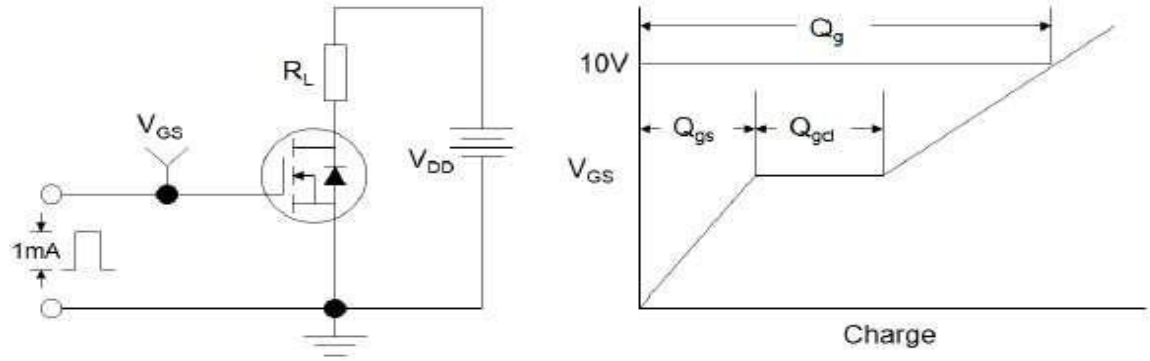
a. Repeatitive rating : pulse width limited by junction temperature.

b. L =0.5mH, I_{AS}=48A, V_{DD}=30V, R_G=25Ω, Starting T_J = 25°C

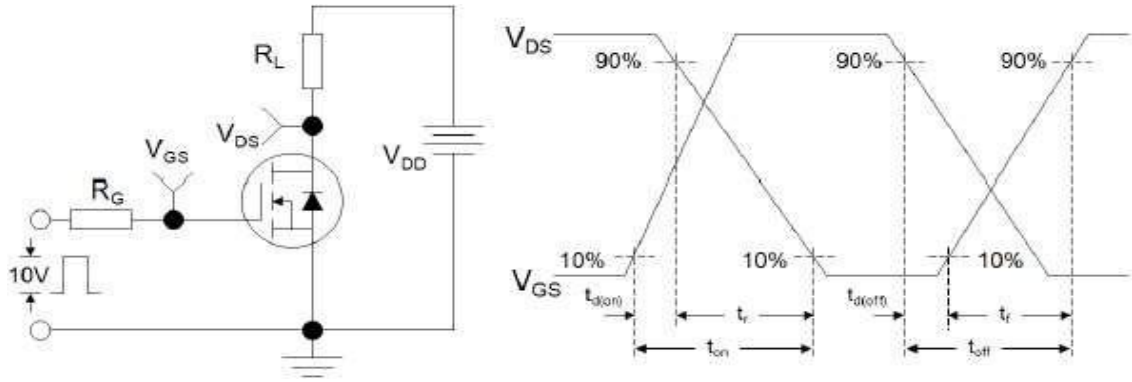
c. I_{SD}≤30A, di/dt = 100A/us, V_{DD}≤ BV_{DSS}, Staring T_J=25°C

d. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.

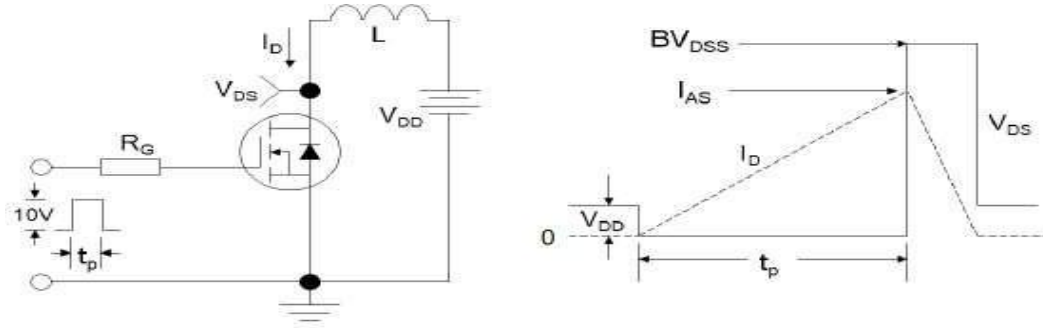
Test circuit and Waveform



Gate Charge Test Circuit & Waveform

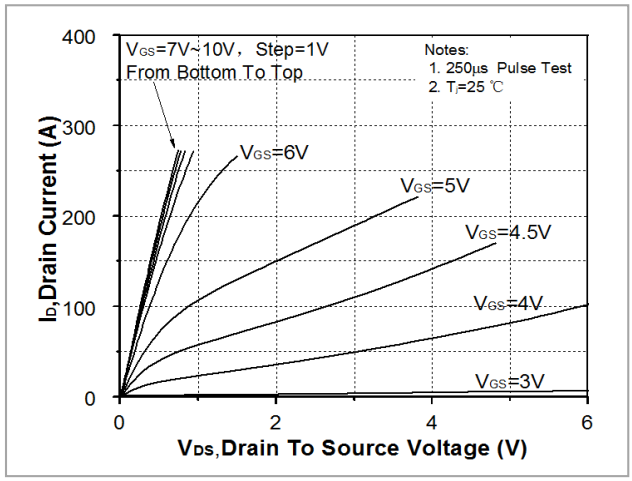


Resistive Switching Test Circuit & Waveforms

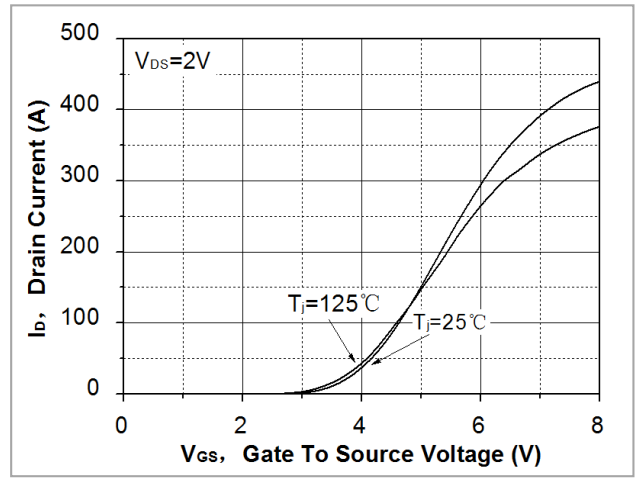


Unclamped Inductive Switching Test Circuit & Waveforms

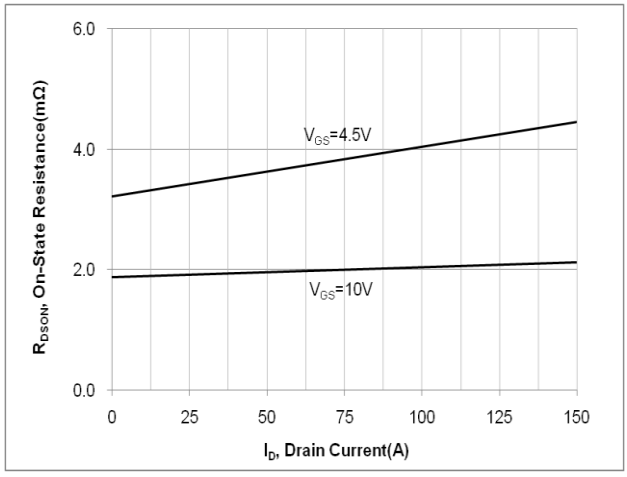
TYPICAL CHARACTERISTICS (25 °C unless noted)



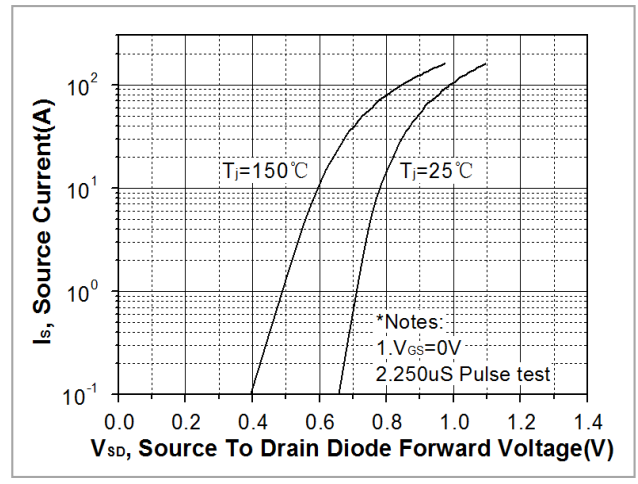
On-state characteristics



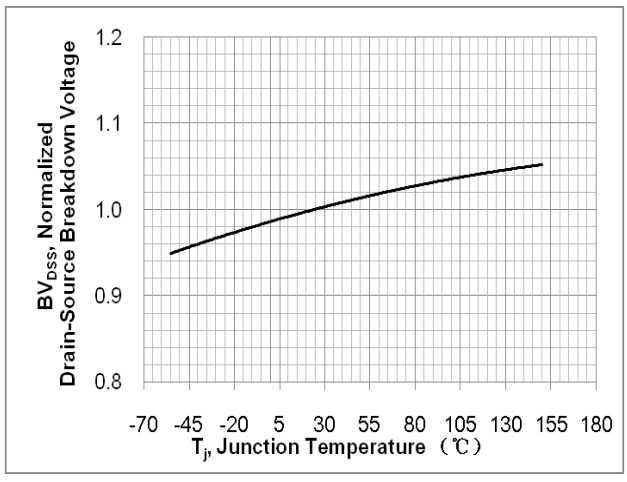
Transfer Characteristics



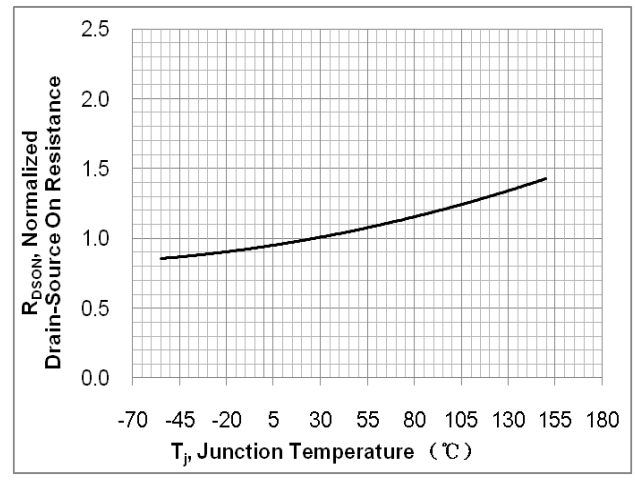
On-resistance variation vs.drain current and gate voltage



On-state current vs. diodeforward voltage

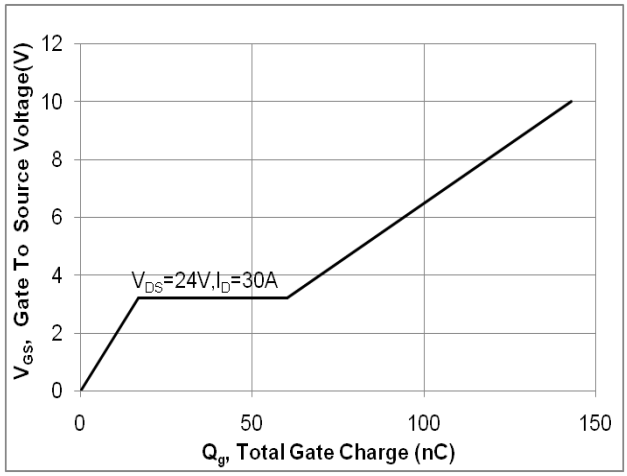


Breakdown voltage variationvs. junction temperature

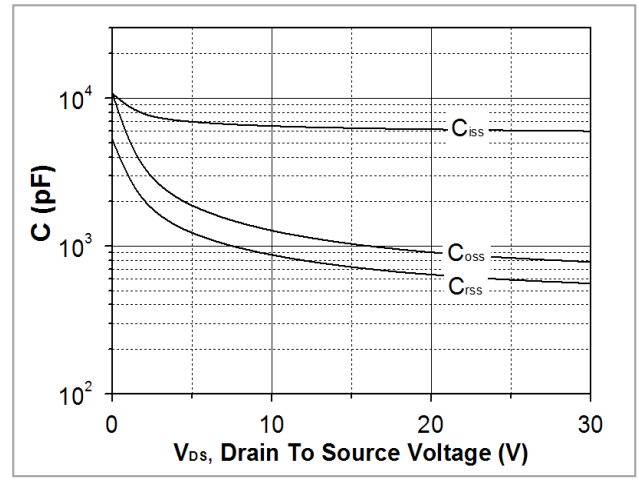


On-resistance variationvs. junction temperature

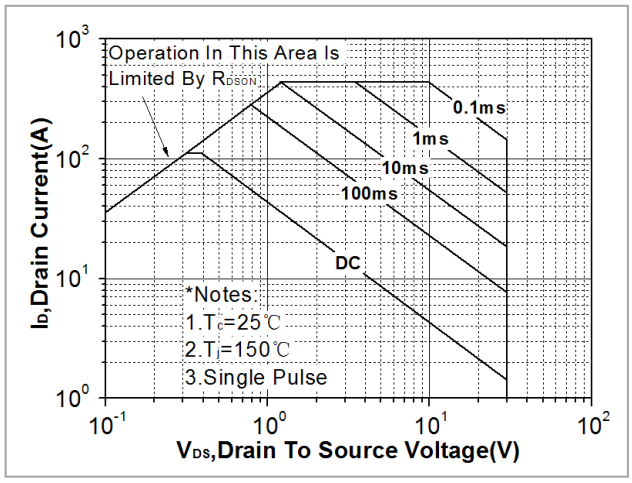
TYPICAL CHARACTERISTICS (25 °C unless noted)



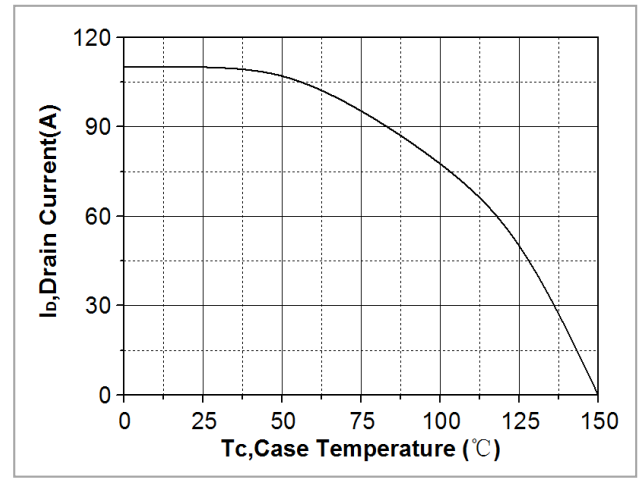
Gate charge characteristics



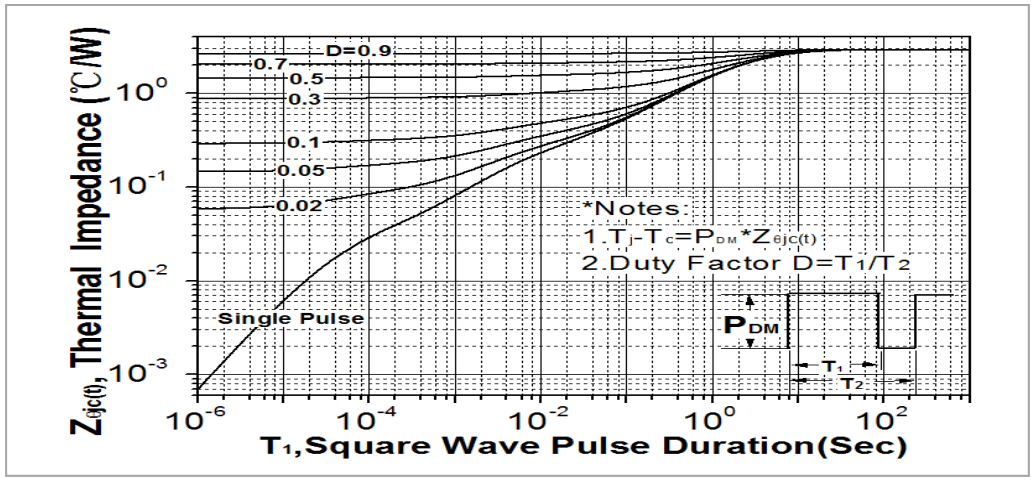
Capacitance Characteristics



Maximum safe operating area



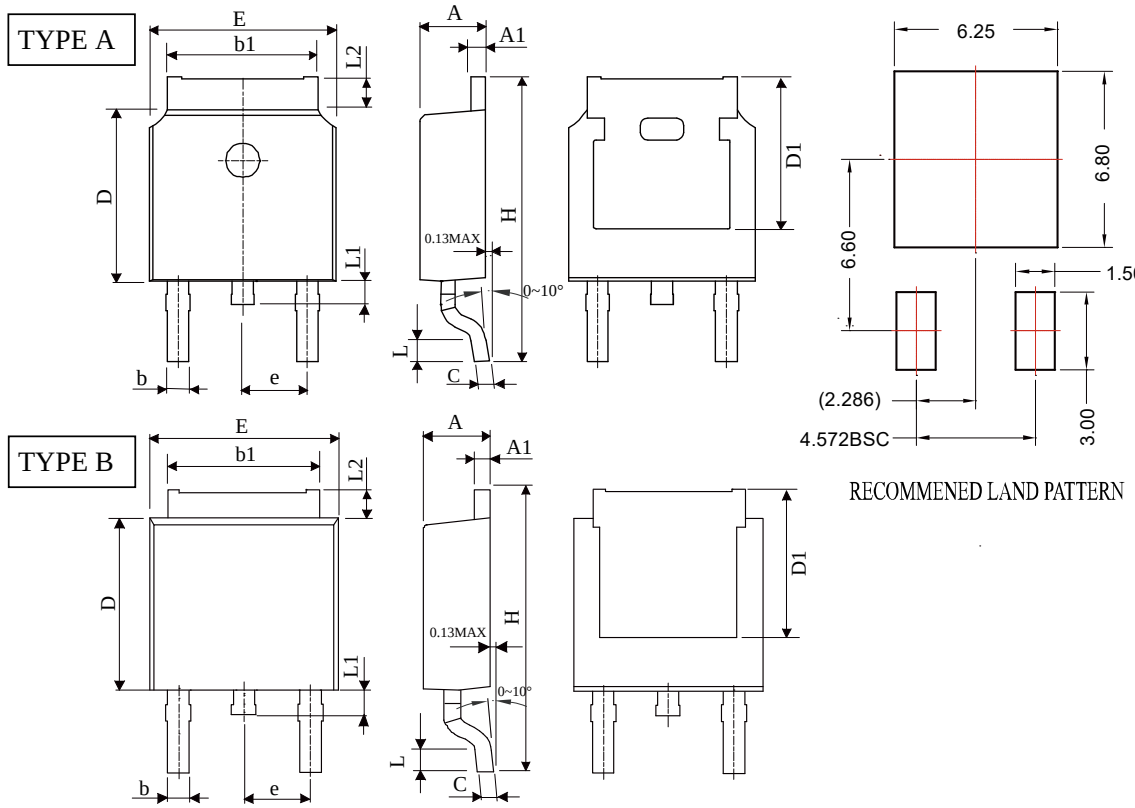
Maximum drain current vs. case temperature



Transient thermal response curve

TO-252

Unit: mm



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