

N-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY

BV_{DSS}	40V
$R_{DS(on)(MAX.)}$	0.0072
I_D	80A

FEATURES

- TrenchFET Power MOSFET
- 100 % R_g and UIS Tested

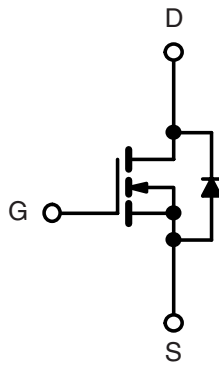
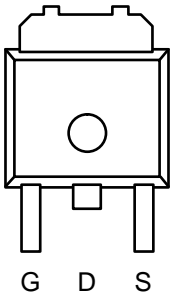


RoHS
COMPLIANT

APPLICATIONS

- Synchronous Rectification
- Power Supplies

TO-252



N-Channel MOSFET

Absolute Maximum Ratings ($T_c = 25\text{ }^\circ\text{C}$, 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	I_D	$T_c = 25\text{ }^\circ\text{C}$	80
		$T_c = 100\text{ }^\circ\text{C}$	38
Pulsed Drain Current	I_{DM}	240	A
Single Pulse Avalanche Energy	E_{AS}	100	mJ
Total Power Dissipation	P_D	113.6	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	-	1.1	$^\circ\text{C} / \text{W}$

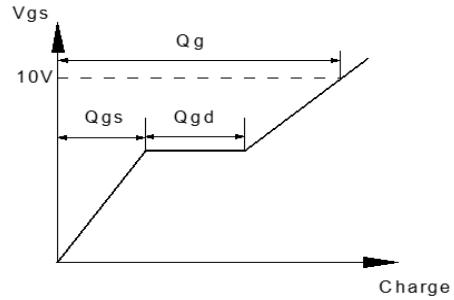
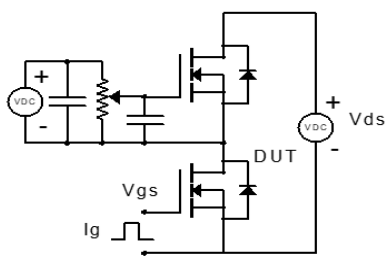
Electrical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$	40	-	-	V
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 25^\circ\text{C}$	-	-	1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	1.2		2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$	-	0.006	0.0072	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 15\text{ A}$	-	0.0089	0.0105	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 20\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	-	2445	-	pF
Output Capacitance	C_{oss}		-	169	-	
Reverse Transfer Capacitance	C_{rss}		-	140	-	
Switching Characteristics						
Total Gate Charge	Q_g	$V_{GS} = 10\text{ V}$, $V_{DS} = 30\text{ V}$, $I_D = 50\text{ A}$	-	47	70	nC
Gate-Source Charge	Q_{gs}		-	10	-	
Gate-Drain Charge	Q_{gd}		-	12	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20\text{ V}$, $I_D \cong 20\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_{GEN} = 3\ \Omega$	-	12	-	nS
Rise Time	t_r		-	30	-	
Turn-Off Delay Time	$t_{d(off)}$		-	42	-	
Fall Time	t_f		-	9	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	V_{SD}	$I_S = 30\text{ A}$, $V_{GS} = 0\text{ V}$	-	-	1.2	V
Continuous Source-Drain Diode Current	I_S	$T_J = 25^\circ\text{C}$	-	-	80	A
Continuous Source Current	I_{SM}		-	-	240	A
Reverse Recovery Charge	Q_{rr}	$T_J = 25^\circ\text{C}$, $I_F = 20\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	-	13	-	nC
Reverse Recovery Time	t_{rr}		-	5	-	ns

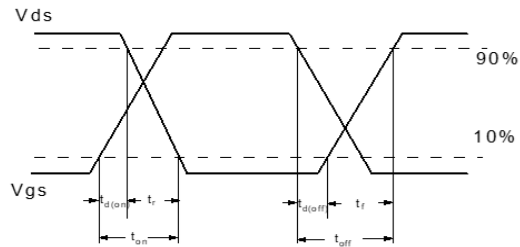
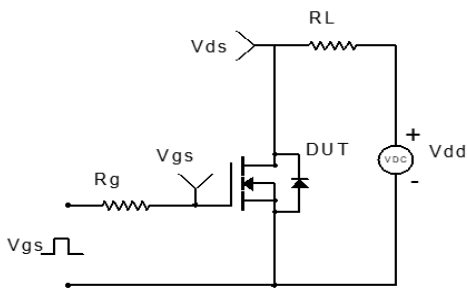
Notos:

- Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- EAS condition: Starting $T_J=25^\circ\text{C}$, $V_{DD}=20\text{V}$, $V_G=10\text{V}$, $R_G=25\text{ohm}$, $L=0.5\text{mH}$, $I_{AS}=20\text{A}$
- $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
- Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

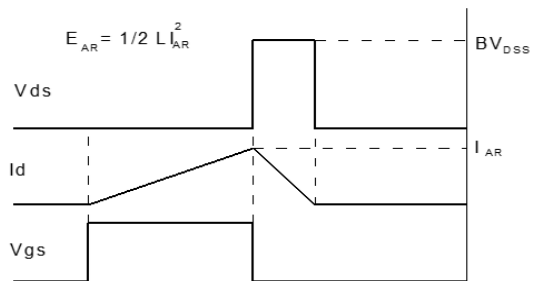
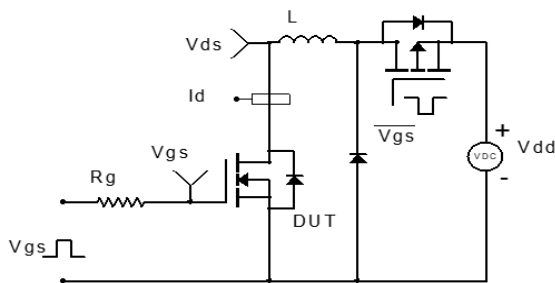
Test circuit and Waveform



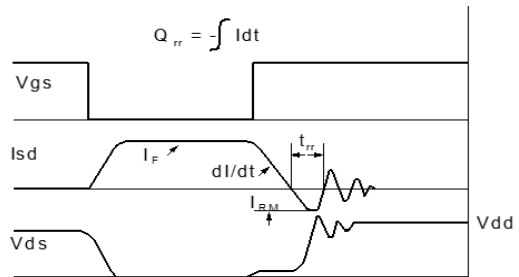
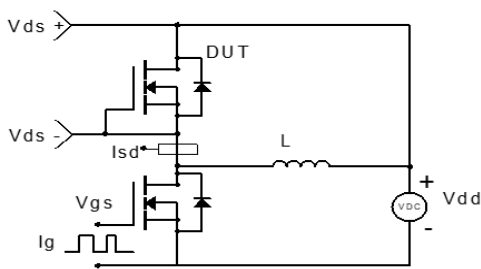
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

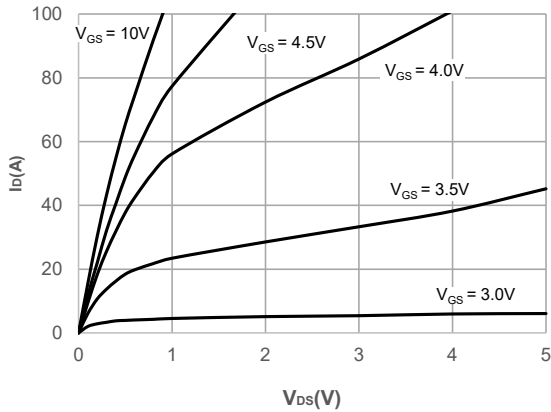


Unclamped Inductive Switching Test Circuit & Waveform

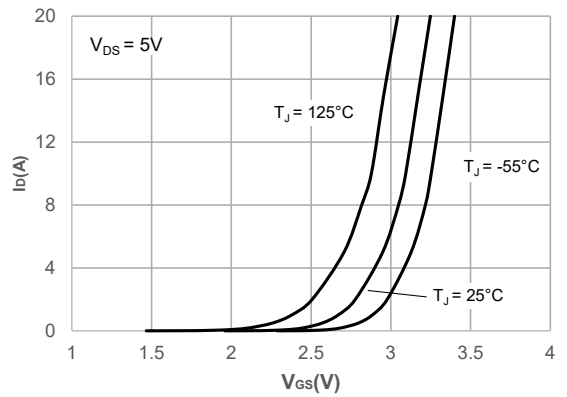


Diode Recovery Test Circuit & Waveform

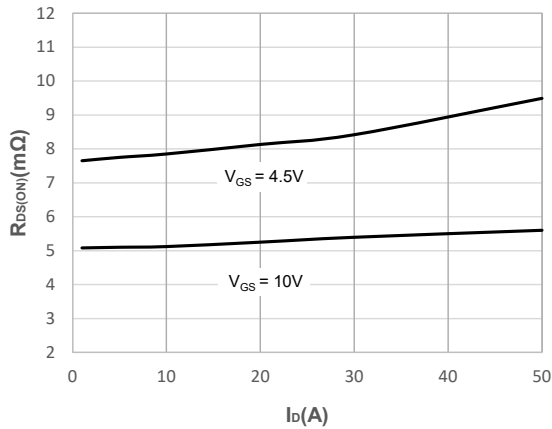
TYPICAL CHARACTERISTICS (25 °C unless noted)



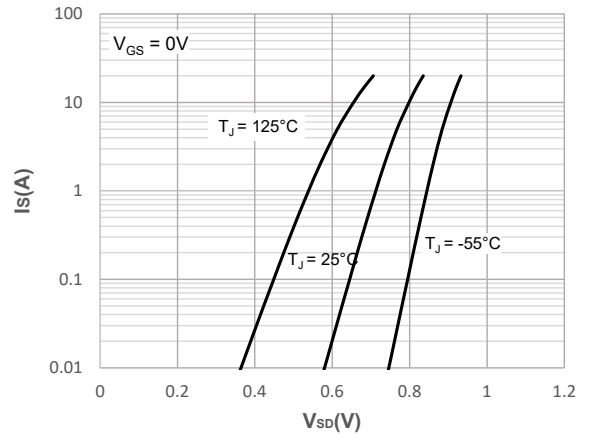
Output Characteristics



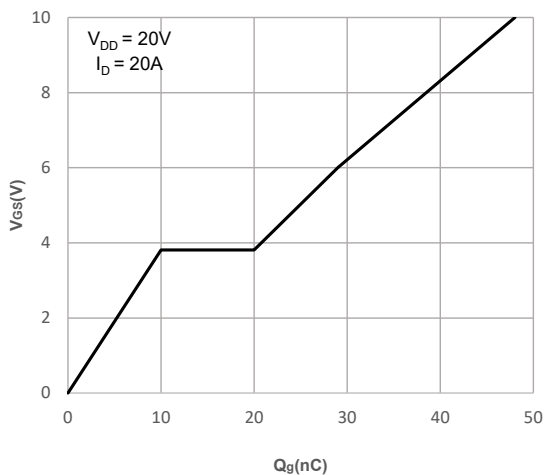
Typical Transfer Characteristics



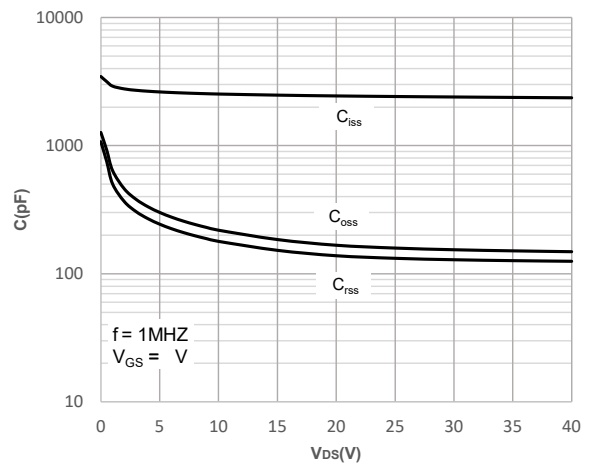
On-resistance vs. Drain Current



Body Diode Characteristics

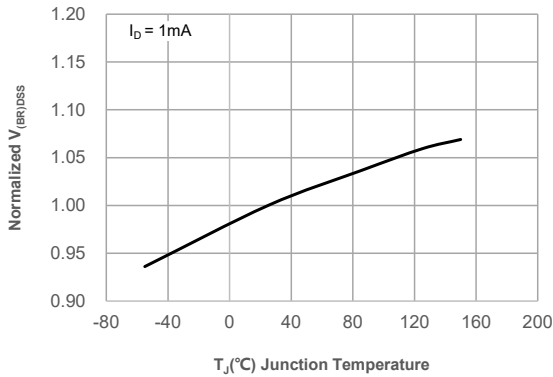


Gate Charge Characteristics

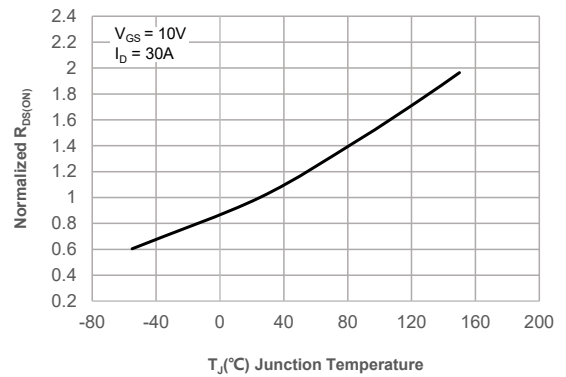


Capacitance Characteristics

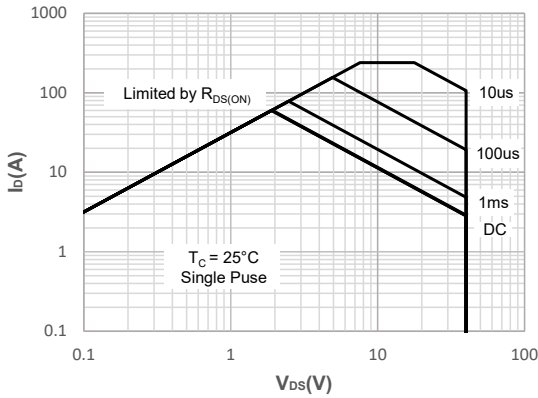
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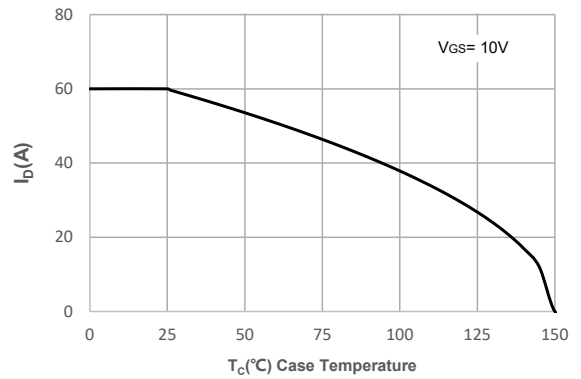
Normalized Breakdown voltage vs. Junction Temperature



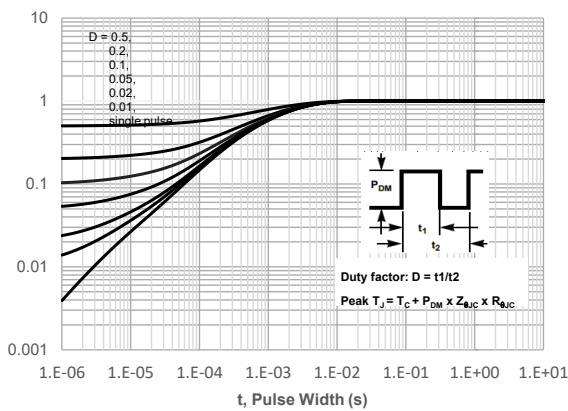
Normalized on Resistance vs. Junction Temperature



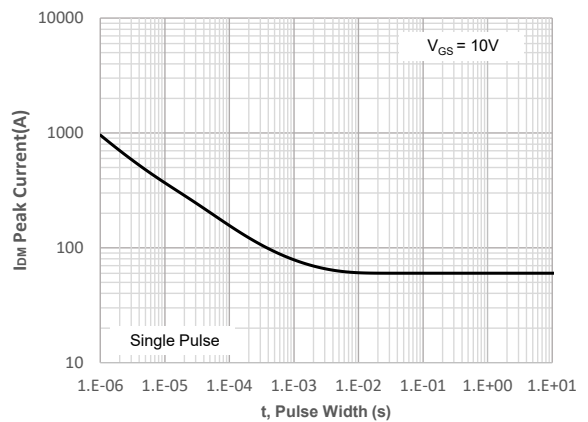
Maximum Safe Operating Area



Maximum Continuous Drain Current vs. Case Temperature

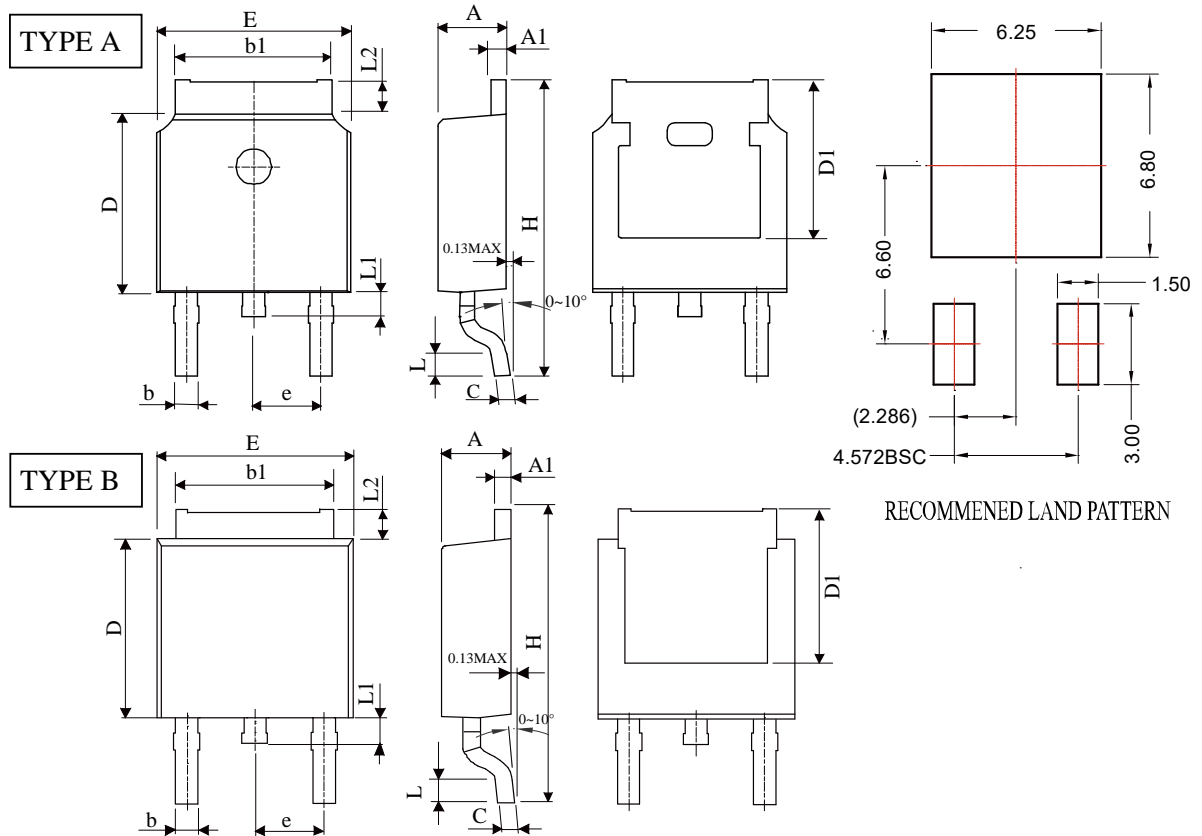


Normalized Maximum Transient Thermal Impedance



Peak Current Capacity

TO-220 _ 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