P-Channel 100 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	-100
$R_{DS(on)}$ max. (Ω) at V_{GS} = -10 V	0.0111
$R_{DS(on)}$ max. (Ω) at V_{GS} = -4.5 V	0.0150
Q_g typ. (nC)	125
I_D (A)	-80
Configuration	Single

FEATURES

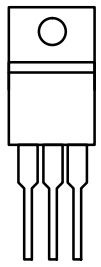
- DT-TrenchPower MOSFET
- Maximum 175 °C junction temperature
- Low $R_{DS(on)}$ minimizes power loss from conduction
- 100 % R_g and UIS tested

RoHS COMPLIANT

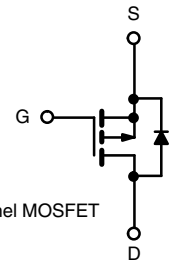
APPLICATIONS

- Battery protection
- Motor drive control
- Load switch

TO-220AB



G D S
Top View



ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-source voltage		V_{DS}	-100	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current [d] (T_J = 175 °C)	T_C = 25 °C	I_D	-80	A
	T_C = 125 °C		-48	
Pulsed drain current (100 µs)		I_{DM}	-240	
Avalanche current	L = 0.1 mH	I_{AS}	-75	
Single pulse avalanche energy [a]		E_{AS}	213	mJ
Power dissipation	T_C = 25 °C [c]	P_D	225	W
	T_C = 125 °C [b]		75	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		**SYMBOL**	**TYPICAL**	**UNIT**
Junction-to-ambient	PCB mount [b]	R_{thJA}	45	°C/W
Junction-to-case		R_{thJC}	0.3	

Notes

a. Duty cycle ≤ 1 %
b. When mounted on 1" square PCB (FR4 material)
c. See SOA curve for voltage derating
d. Limited by package

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0 V, I_D = -250 µA	-100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 µA	-1.5	-	-2.5	
Gate-body leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = -100 V, V_{GS} = 0 V	-	-	-1	µA
		V_{DS} = -80 V, V_{GS} = 0 V, T_J = 125 °C	-	-	-50	
		V_{DS} = -80 V, V_{GS} = 0 V, T_J = 175 °C	-	-	-250	
On-state drain current [a]	$I_{D(on)}$	V_{DS} ≤ -5 V, V_{GS} = -10 V	-80	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = -10 V, I_D = -30 A	-	0.0111	0.0149	Ω
		V_{GS} = -4.5 V, I_D = -20 A	-	0.0150	0.0197	
Forward transconductance [a]	g_{fs}	V_{DS} = -15 V, I_D = -25 A	-	60	-	S
Dynamic [b]						
Input capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = -50 V, f = 1 MHz	-	14208	-	pF
Output capacitance	C_{oss}		-	3980	-	
Reverse transfer capacitance	C_{rss}		-	253	-	
Total gate charge [c]	Q_g	V_{DS} = -50 V, V_{GS} = -10 V, I_D = -30 A	-	125	190	nC
Gate-source charge [c]	Q_{gs}		-	29	-	
Gate-drain charge [c]	Q_{gd}		-	30	-	
Gate resistance	R_g	f = 1 MHz	1.3	6.5	13	Ω
Turn-on delay time [c]	$t_{d(on)}$	V_{DD} = -50 V, R_L = 0.71 Ω I_D ≅ -30 A, V_{GEN} = -10 V, R_g = 1 Ω	-	20	30	ns
Rise time [c]	t_r		-	40	60	
Turn-off delay time [c]	$t_{d(off)}$		-	110	200	
Fall time [c]	t_f		-	40	60	
Drain-Source Body Diode Characteristics (T_C = 25 °C [b])						
Continuous current	I_S		-	-	-80	A
Pulsed current	I_{SM}		-	-	-240	
Forward voltage [a]	V_{SD}	I_F = -85 A, V_{GS} = 0 V	-	-1	-1.5	V
Reverse recovery time	t_{rr}	I_F = -85 A, dI/dt = 100 A/µs	-	110	170	ns
Peak reverse recovery charge	$I_{RM(REC)}$		-	-7	-11	A
Reverse recovery charge	Q_{rr}		-	0.38	0.57	µC

Notes

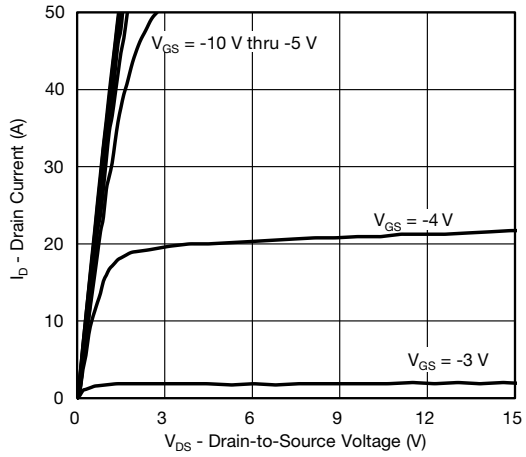
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %

b. Guaranteed by design, not subject to production testing

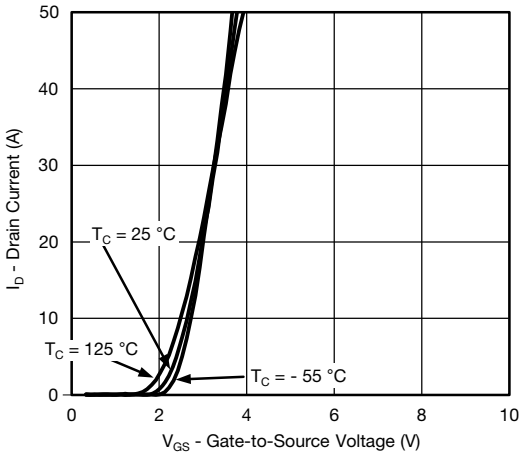
c. Independent of operating temperature

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

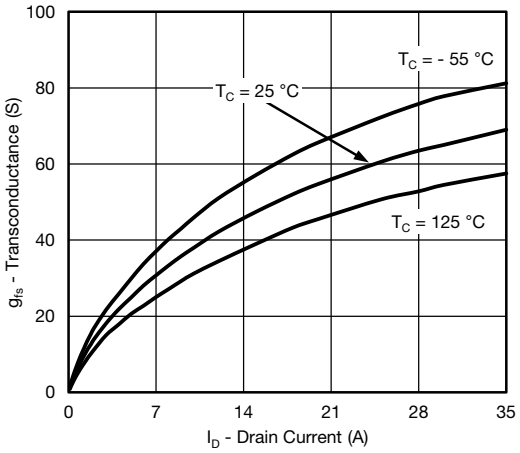
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



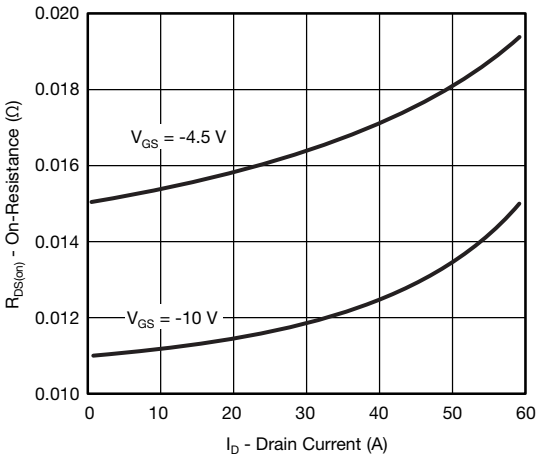
Output Characteristics



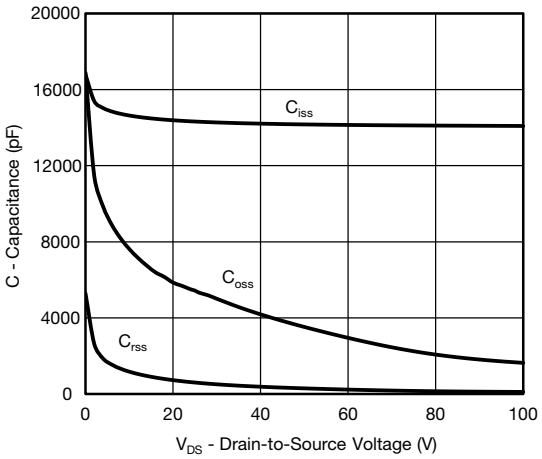
Transfer Characteristics



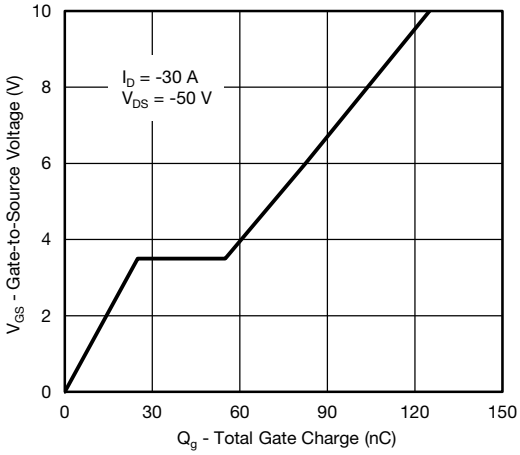
Transconductance



On-Resistance vs. Drain Current

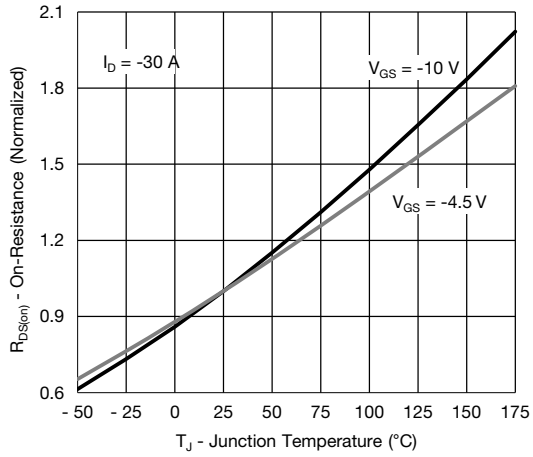


Capacitance

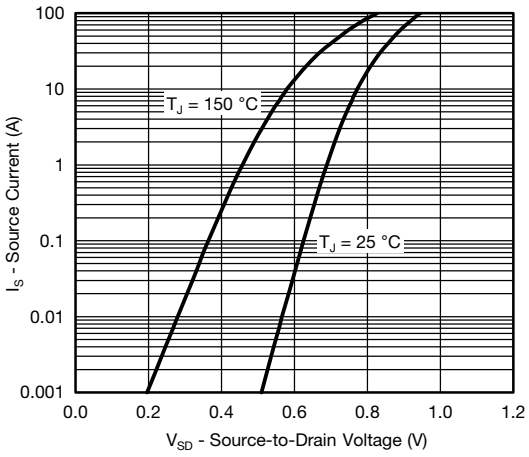


Gate Charge

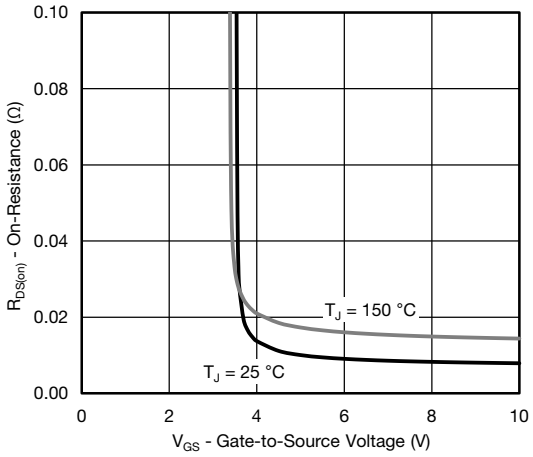
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



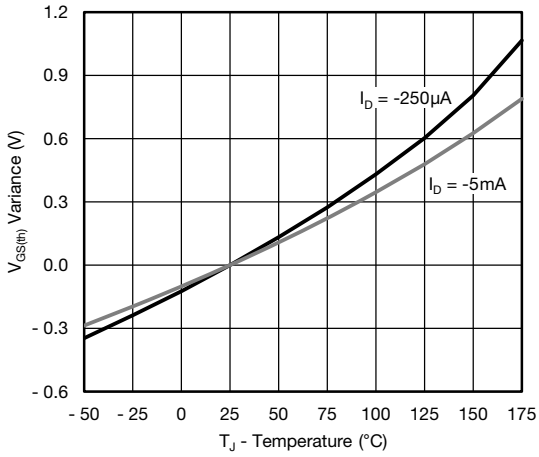
On-Resistance vs. Junction Temperature



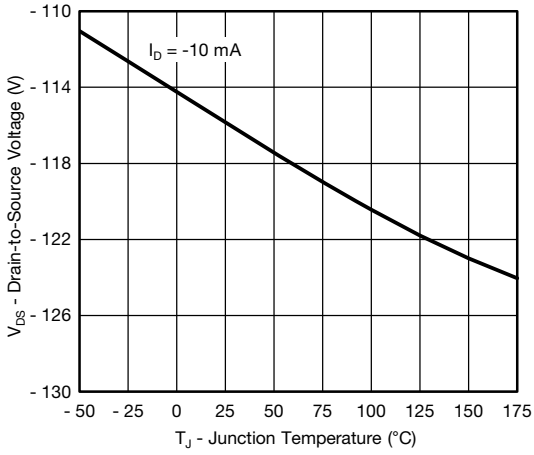
Source Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

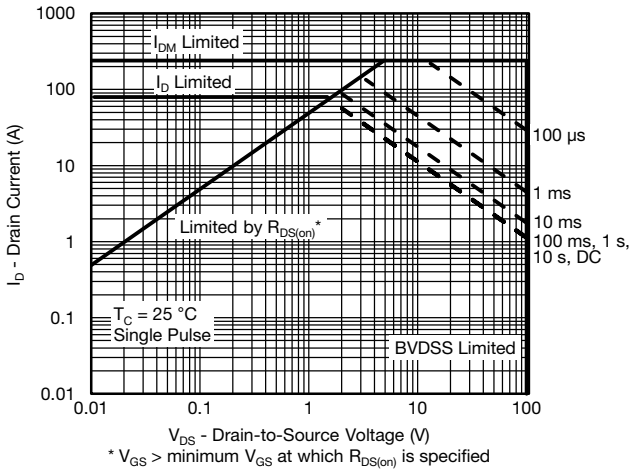


Threshold Voltage

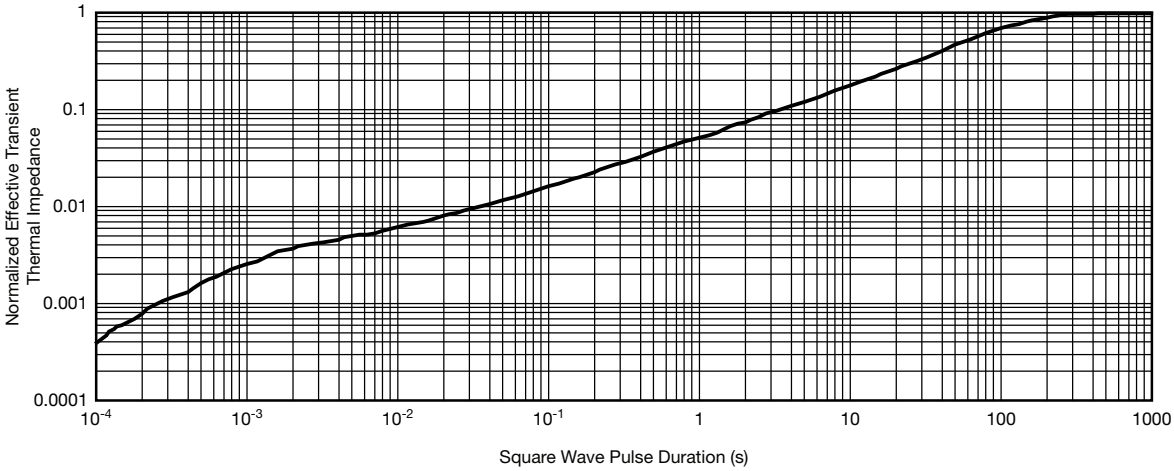


Drain Source Breakdown vs. Junction Temperature

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)

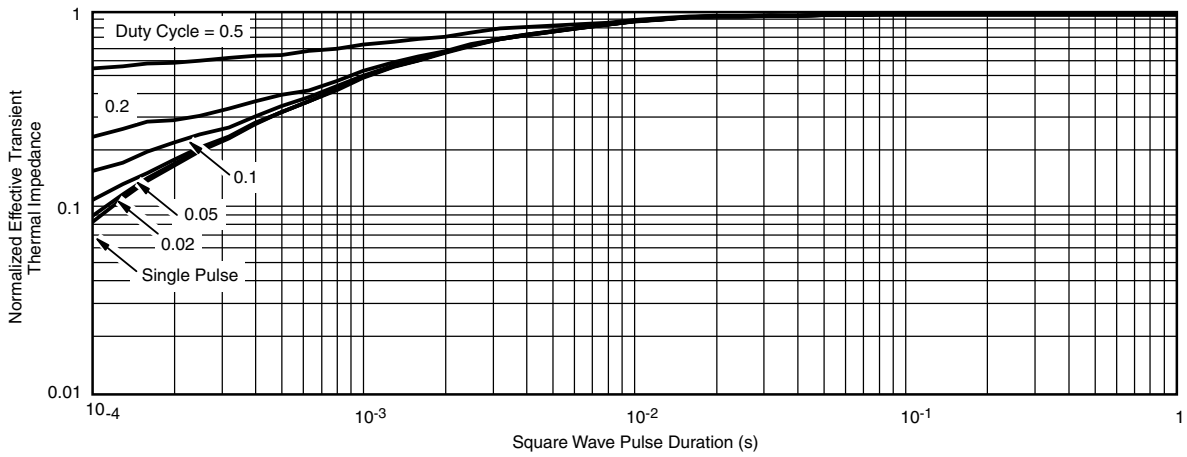


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



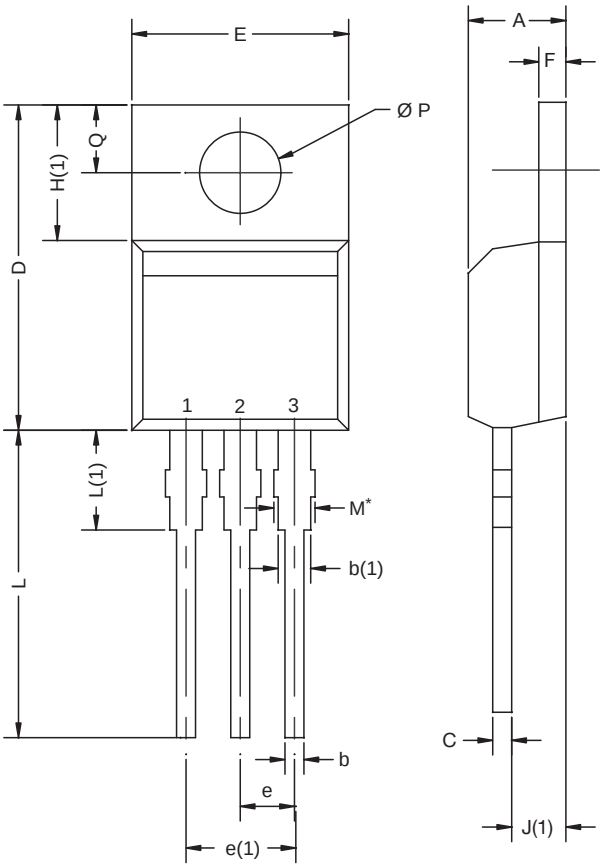
Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction to Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction to Case (25 °C)

  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

TO-220AB



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118
ECN: X12-0208-Rev. N, 08-Oct-12 DWG: 5471				

Notes

* M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM

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