N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(TYP.)	I_D (A)	Q_g (TYP.)
100	3.2at V_{GS} = 10 V	185	83.4 nC

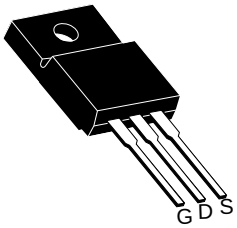
FEATURES

- Super Trench III
- Maximum 175 °C junction temperature
- 100 % R_g and UIS tested

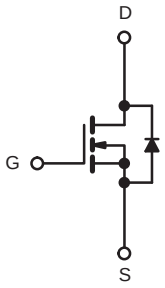
RoHS COMPLIANT

APPLICATIONS

- Power supplies:
  - Uninterruptible power supplies
  - AC/DC switch-mode power supplies
  - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Battery management



Top View



N-Channel MOSFET

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 (T_J = 150 °C)	T_C = 25 °C	I_D	185	A
	T_C = 100 °C		125	
Pulsed Drain Current (t = 100 µs)		I_{DM}	702	
Avalanche Current	L = 0.1 mH	I_{AS}	180	
Single Avalanche Energy [a]		E_{AS}	930	mJ
Maximum Power Dissipation [a]	T_C = 25 °C	P_D	310	W
	T_C = 100 °C		100	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) [b,c]	R_{thJA}	48	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.75	

Notes

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

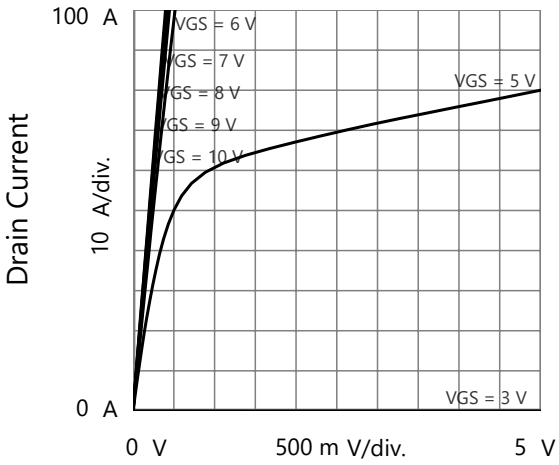
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2	-	4	
Gate-Body 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	-	-	100	
		V_{DS} =80 V, V_{GS}= 0 V, T_J = 175 °C	-	-	2	mA
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A	-	3.2	3.8	mΩ
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 65 A	-	92	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz	-	5920	-	pF
Output Capacitance	C_{oss}		-	650	-	
Reverse Transfer Capacitance	C_{rss}		-	43	-	
Total Gate Charge [c]	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 30 A	-	83.4	-	nC
Gate-Source Charge [c]	Q_{gs}		-	36.5	-	
Gate-Drain Charge [c]	Q_{gd}		-	33.5	-	
Gate Resistance	R_g	f = 1 MHz	-	0.8	-	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 50 V, R_L = 1.67 Ω I_D ≅ 65 A, V_{GEN} = 10 V, R_g = 1 Ω	-	20	-	ns
Rise Time [c]	t_r		-	11.5	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	48	-	
Fall Time [c]	t_f		-	9	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Pulsed Current (t = 100 µs)	I_{SM}		-	-	702	A
Forward Voltage [a]	V_{SD}	I_F = 65 A, V_{GS} = 0 V	-	-	1.2	V
Reverse Recovery Time	t_{rr}	I_F = 65 A, di/dt = 100 A/µs	-	78	-	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$		-	5	-	A
Reverse Recovery Charge	Q_{rr}		-	150	-	nC

Notes

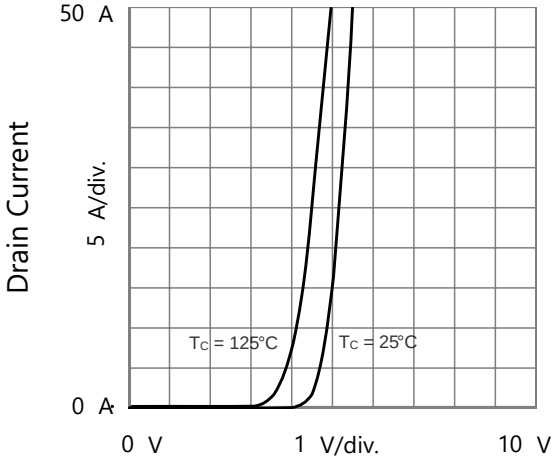
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

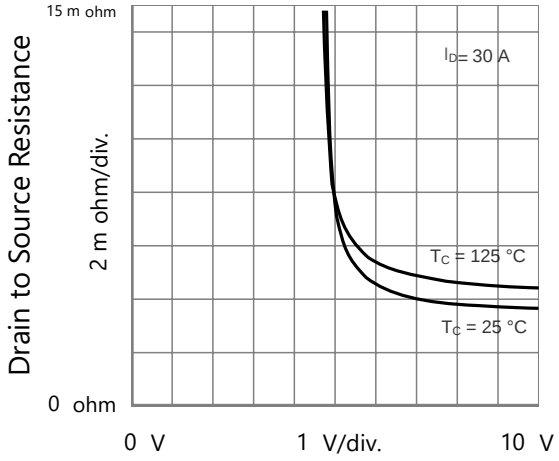
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



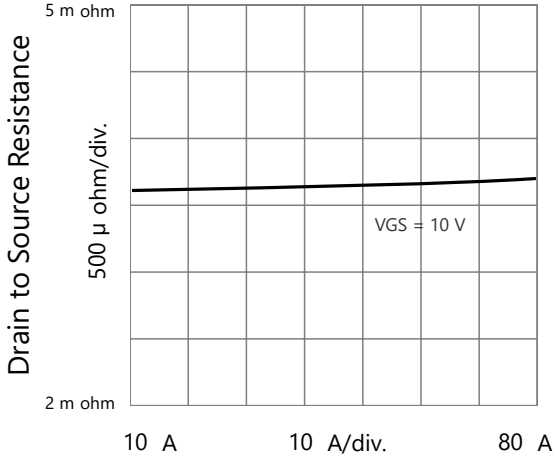
Drain to Source Voltage
Output Characteristics



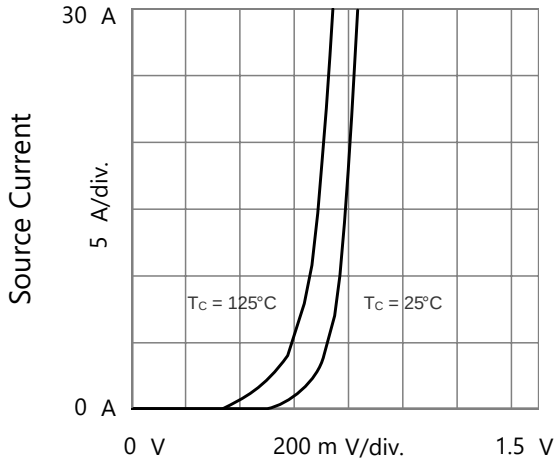
Gate to Source Voltage
Transfer Characteristics



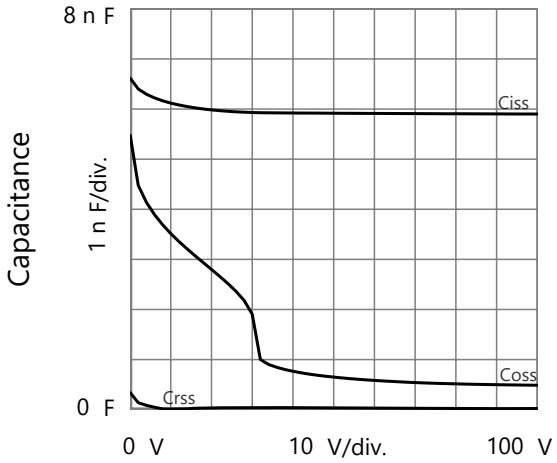
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

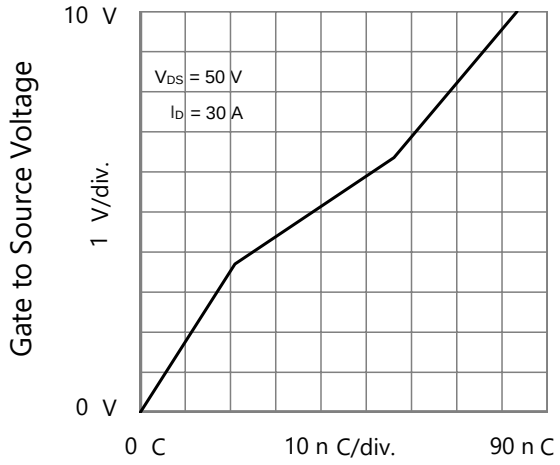


Source to Drain Voltage
Body Diode Forward Characteristics

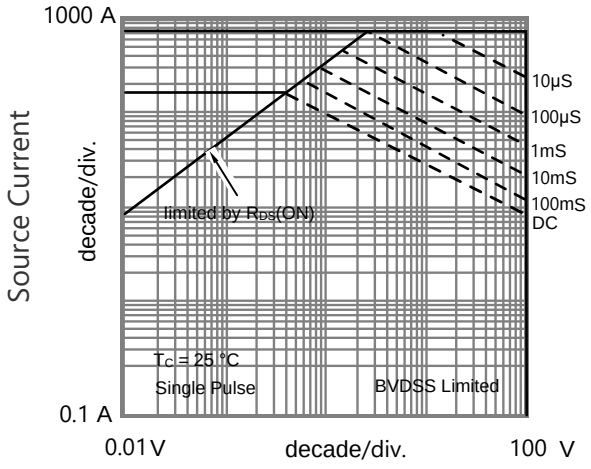


Drain to Source Voltage
Capacitances

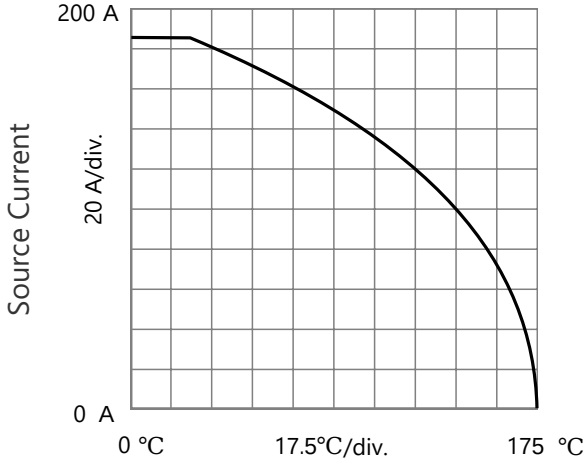
TYPICAL CHARACTERISTICS (T = 25 °C, unless otherwise noted)



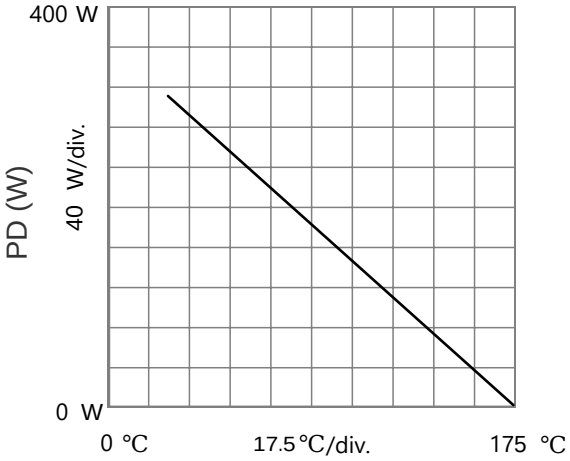
Gate to Source Voltage vs. GateCharge



Safe Operating Area, Junction-to-Ambient

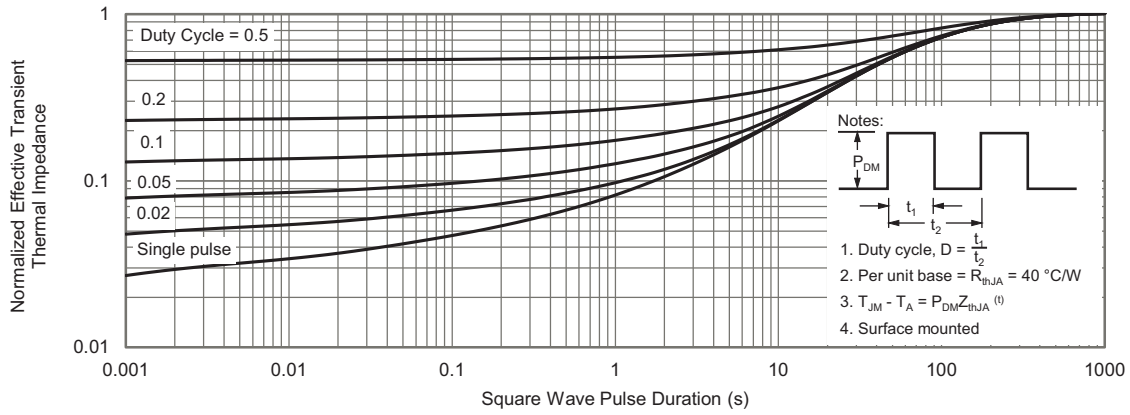


Current Derating



Power Derating

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



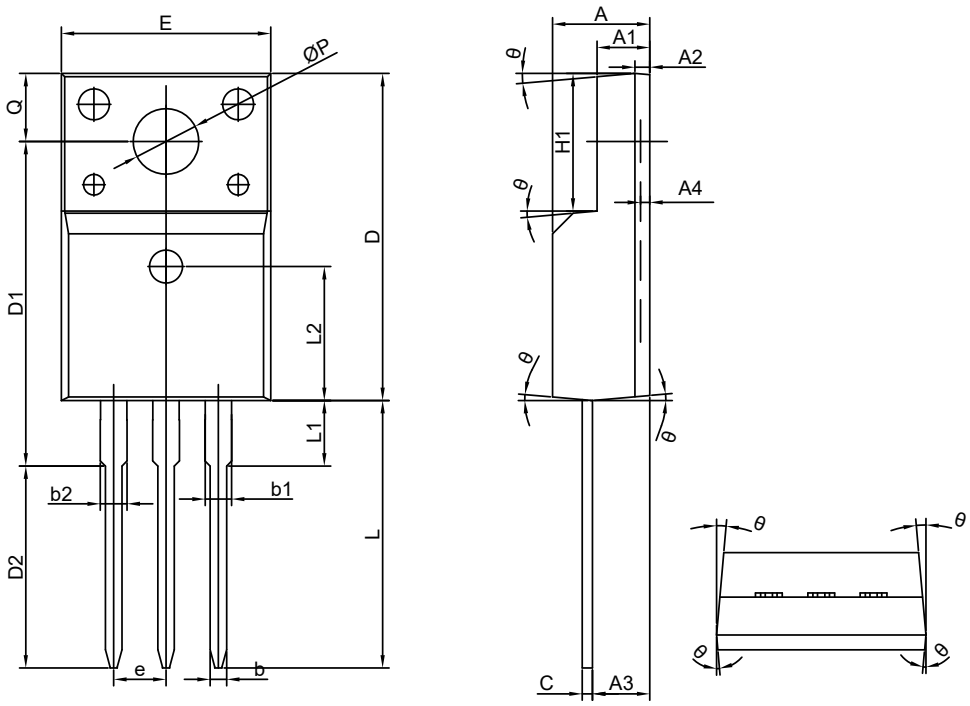
Normalized Thermal Transient Impedance, Junction-to-Ambient

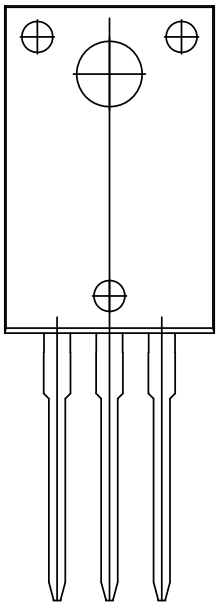
Note

- 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-220F-3L PACKAGE OUTLINE





COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.30	4.72	5.10
A1	2.25	2.56	2.90
A2	0.72 REF		
A3	2.28	2.78	3.50
A4	0.45 MAX		
b	0.65	-	0.95
b1	1.00	-	1.55
b2	-	-	1.55
c	0.40	0.50	0.65
D	15.47	15.87	16.37
D1	15.35	15.75	16.25
E	9.76	10.16	10.76
e	2.54 BSC		
H1	6.28	6.68	7.08
L	12.48	12.98	13.50
L1	2.90	-	3.80
L2	2.54 BSC		
ØP	2.98	3.18	3.50
Q	3.00	-	3.60
θ	3°	5°	7°

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