P-Channel 20-V (D-S) Power MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (m)(Typ.)	I_D (A)	Q_g (Typ.)
- 20	24 at V_{GS} = - 4.5 V	- 7[a]	17 nC
	30 at V_{GS} = - 2.5 V		

FEATURES

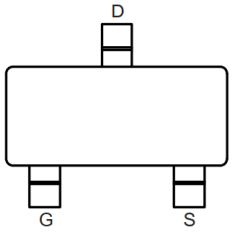
- DT-Trench Power MOSFET
- 100 % Rg and UIS Tested
- ESD Protected

Pb-free
RoHS COMPLIANT

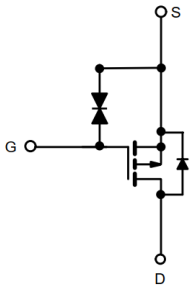
APPLICATIONS

- Portable Devices
  - Load Switch
  - Battery Switch

SOT-23 Pin Configuration



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	- 20	V
Gate-Source Voltage		V_{GS}	± 8	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	- 7[a]	A
	T_C = 70 °C		- 5.8[a]	
	T_A = 25 °C		- 3[b, c]	
	T_A = 70 °C		- 2.3[b, c]	
Pulsed Drain Current		I_{DM}	- 21	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 5.5[a]	
	T_A = 25 °C		- 2.5[b, c]	
Maximum Power Dissipation	T_C = 25 °C	P_D	6	W
	T_C = 70 °C		3.9	
	T_A = 25 °C		1.6[b, c]	
	T_A = 70 °C		1.05[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature)[d, e]			260	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b, e]	t ≤ 5 s	R_{thJA}	40	60	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	5.5	6.5	

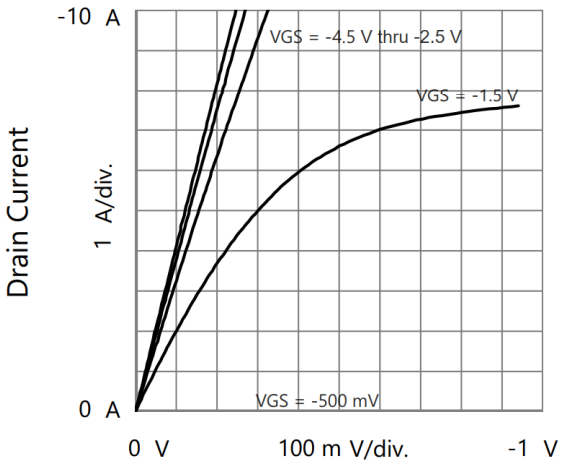
Notes:
a. Package limited.
b. Surface Mounted on 1" x 1" FR4 board.
c. t = 5 s.
d. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.
e. Maximum under Steady State conditions is 80 °C/W.

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	- 20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 12		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			3		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 0.3		- 1	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 8 V			± 20	µA
		V_{DS} = 0 V, V_{GS} = ± 4.5 V			± 0.5	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 20 V, V_{GS} = 0 V			- 1	
		V_{DS} = - 16 V, V_{GS} = 0 V, T_J = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \leq$ - 5 V, V_{GS} = - 4.5 V	- 7			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 4 A		24	30	mΩ
		V_{GS} = - 2.5 V, I_D = - 3 A		30	40	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 5 V, I_D = - 4 A		10		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz		1318		pF
Output Capacitance	C_{oss}			162		
Reverse Transfer Capacitance	C_{rss}			141		
Total Gate Charge	Q_g	V_{DS} = - 10 V, V_{GS} = - 4.5 V, I_D = - 4 A		17		nC
Gate-Source Charge	Q_{gs}			2		
Gate-Drain Charge	Q_{gd}			4		
Gate Resistance	R_g	f = 1 MHz		16		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 10 V, I_D = - 4 A, V_{GEN} = - 4.5 V, R_g = 25 Ω		9		nS
Rise Time	t_r			30		
Turn-Off Delay Time	$t_{d(off)}$			68		
Fall Time	t_f			20		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			- 7	A
Pulse Diode Forward Current	I_{SM}				- 21	
Body Diode Voltage	V_{SD}	I_S = - 1 A, V_{GS} = 0 V		- 0.6	- 1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 4 A, dI/dt = 100 A/µs, T_J = 25 °C		30		nS
Body Diode Reverse Recovery Charge	Q_{rr}			20		nC
Reverse Recovery Fall Time	t_a			13		nS
Reverse Recovery Rise Time	t_b			17		

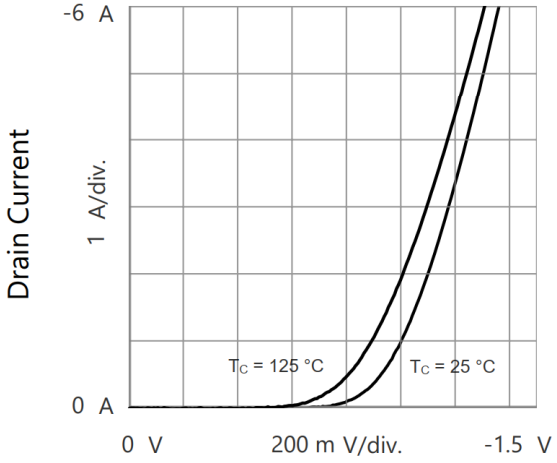
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

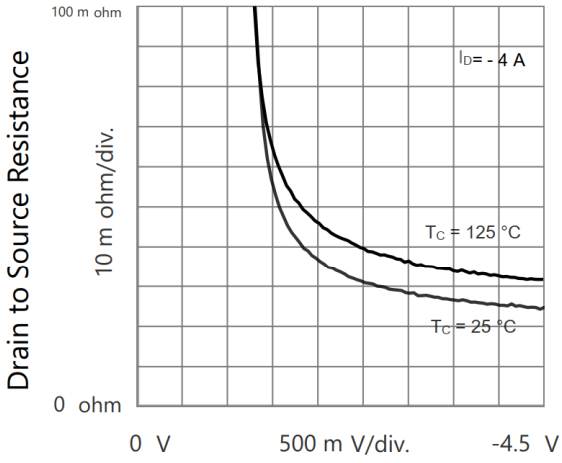
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



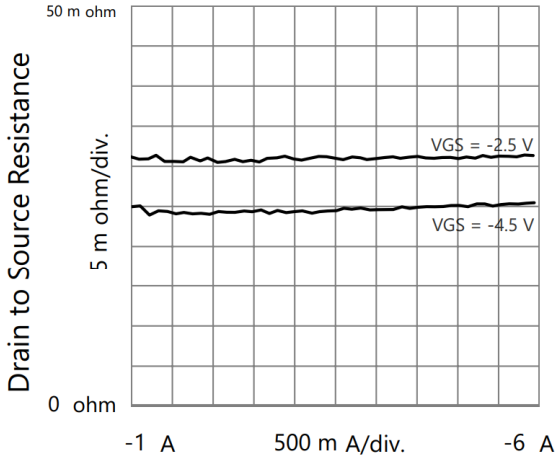
Drain to Source Voltage
Output Characteristics



Gate to Source Voltage
Transfer Characteristics

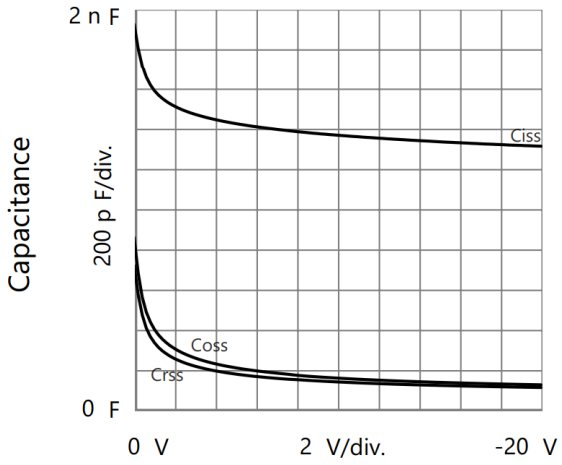


Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage

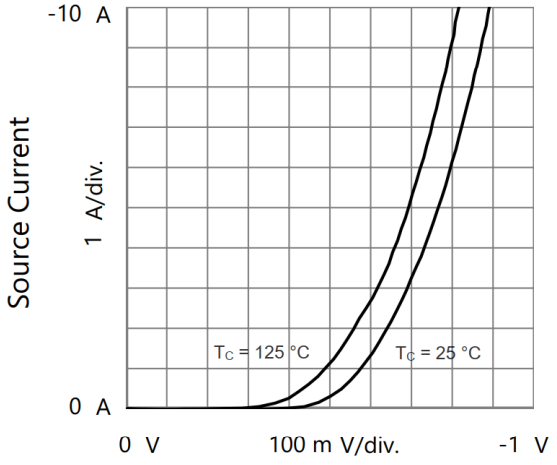


TC = 125 °C TC = 25 °C

Drain Current
Drain to Source Resistance vs. Drain Current

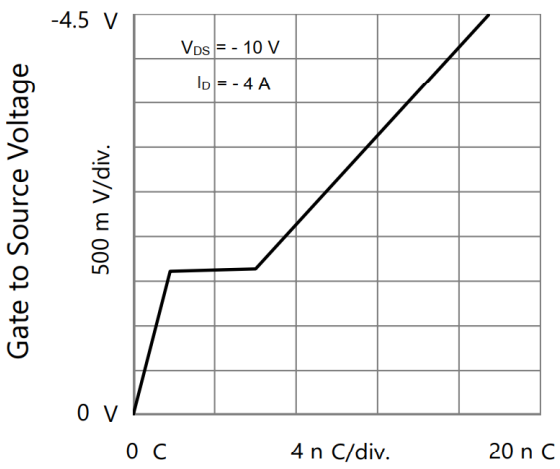


Drain to Source Voltage
Capacitances

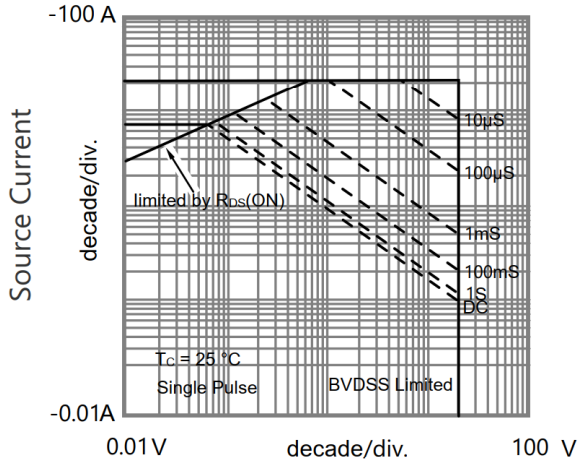


Source to Drain Voltage
Body Diode Forward Characteristics

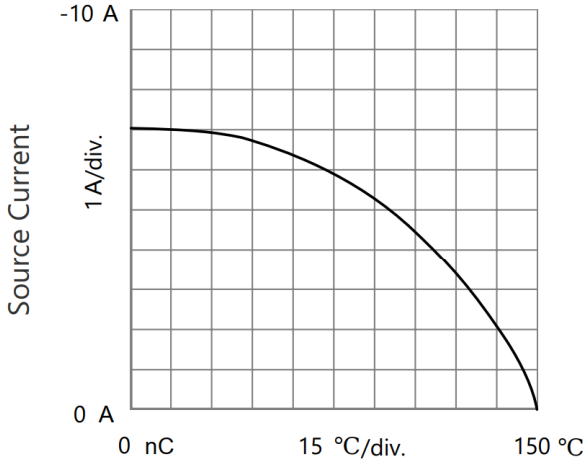
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



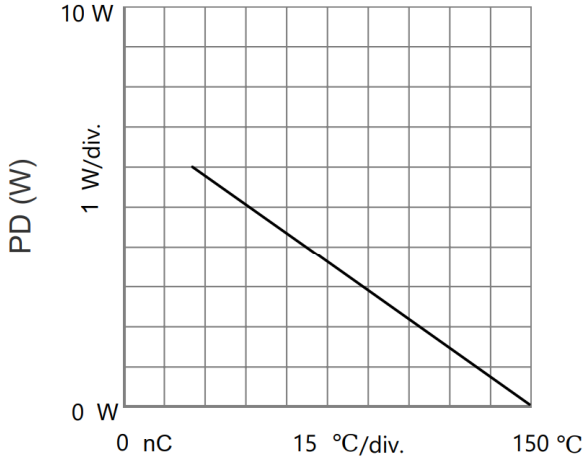
Gate to Source Voltage vs. GateCharge



Safe Operating Area, Junction-to-Ambient

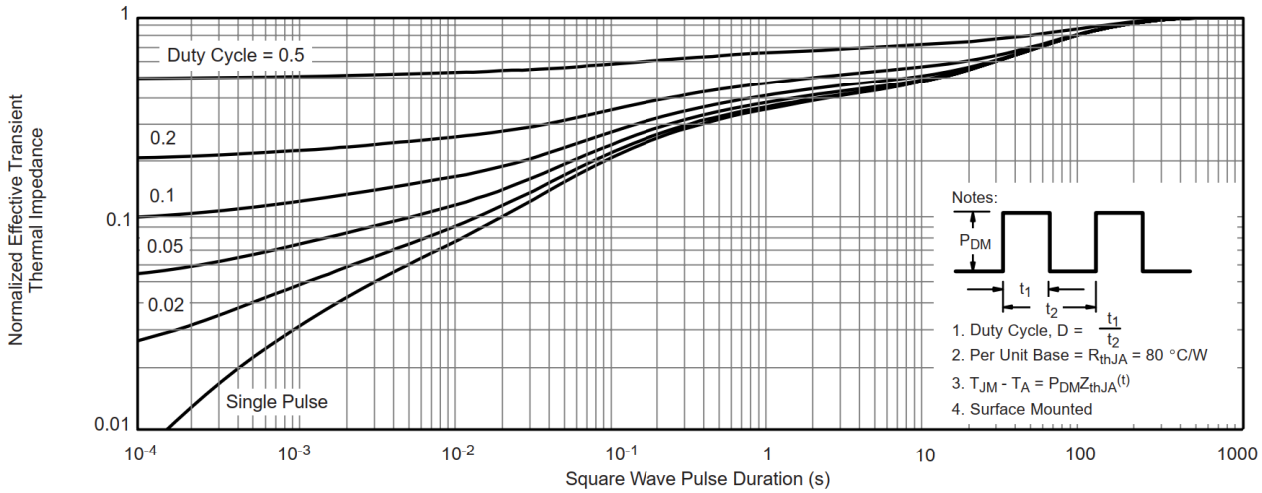


Current Derating

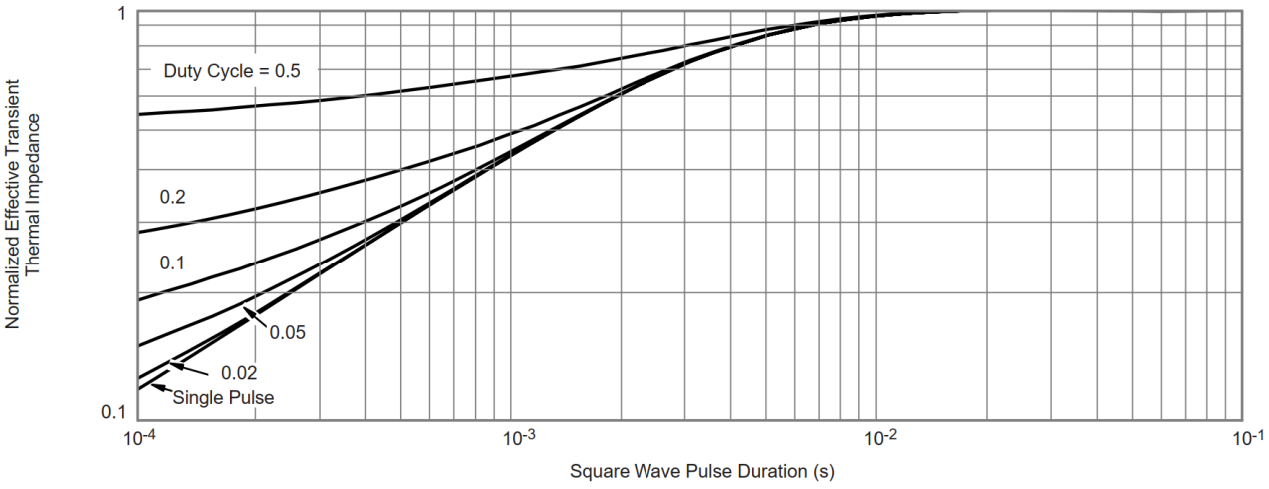


Power Derating

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

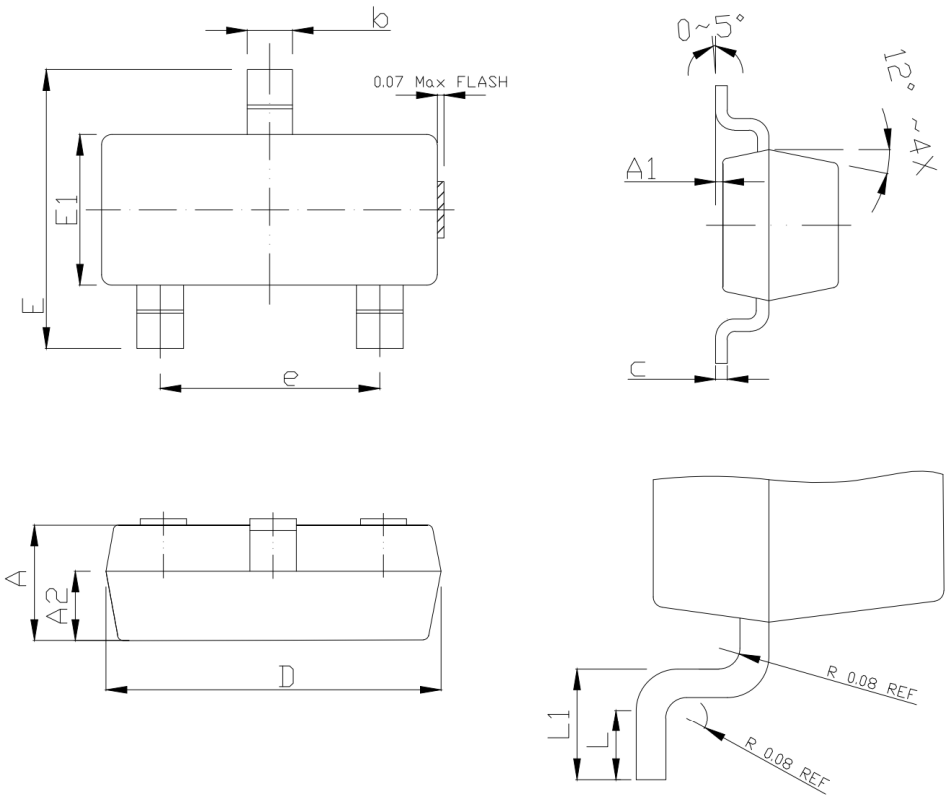


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

SOT-23 PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.80	1.00	1.30
A1	0.00	0.05	0.15
b	0.25	0.40	0.55
c		0.11 BSC	
D	2.60	2.90	3.20
E	2.10	2.40	2.70
E1	1.10	1.30	1.48
e		1.90 BSC	
L	0.17	-	-
L1	0.28	0.40	0.53
A2		0.60 REF	

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