

P-Channel 60 V (D-S) MOSFET



RoHS
COMPLIANT

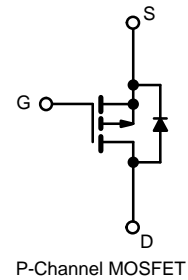
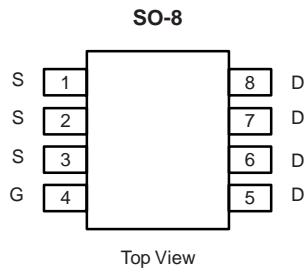
PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (mΩ)(Typ.)	I _D (A) ^a	Q _g (Typ.)
- 60	24 at V _{GS} = 10 V	- 10	76 nC
	31 at V _{GS} = 4.5 V		

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

APPLICATIONS

- Load Switch



ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	- 60	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	- 10	A
	T _C = 70 °C	- 7.3	
Pulsed Drain Current	I _{DM}	- 30	
Single-Pulse Avalanche Energy	E _{AS}	50	mJ
Maximum Power Dissipation	T _C = 25 °C	15	W
	T _C = 70 °C	9.6	
	T _A = 25 °C	2.5 ^{b,c}	
	T _A = 70 °C	1.6 ^{b,c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^c	t ≤ 10 s	R _{thJA}	35	50	°C/W
Maximum Junction-to-Case	Steady State	R _{thJC}	6.5	8.3	

Notes:

- Based on T_C = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0, I_D = -250\text{ }\mu\text{A}$	- 60			V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1		- 3	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq -10\text{ V}, V_{GS} = -10\text{ V}$	- 10			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		24	29	m Ω
		$V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$		31	40	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -5\text{ A}$		45		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		3510		pF
Output Capacitance	C_{oss}			134		
Reverse Transfer Capacitance	C_{rss}			131		
Total Gate Charge	Q_g	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -5\text{ A}$		76		nC
Gate-Source Charge	Q_{gs}			16		
Gate-Drain Charge	Q_{gd}			19		
Gate Resistance	R_g	$f = 1\text{ MHz}$		5		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 2.0\text{ }\Omega$ $I_D \cong -5\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		12		ns
Rise Time	t_r			7		
Turn-Off Delay Time	$t_{d(off)}$			70		
Fall Time	t_f			40		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			- 10	A
Pulse Diode Forward Current (100 μs)	I_{SM}				- 30	
Body Diode Voltage	V_{SD}	$I_S = -1\text{ A}$		- 0.6	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -5\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		45		ns
Body Diode Reverse Recovery Charge	Q_{rr}			59		nC
Reverse Recovery Fall Time	t_a			29		ns
Reverse Recovery Rise Time	t_b			16		

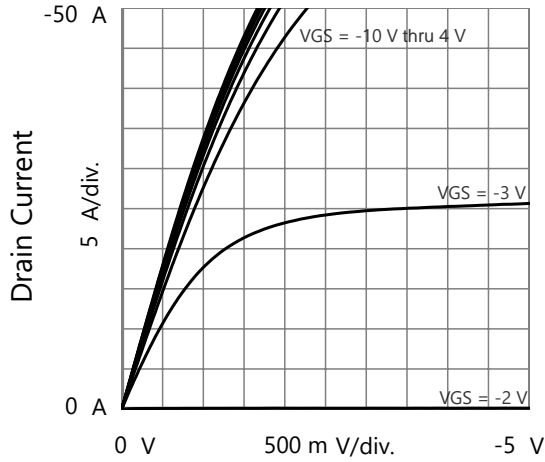
Notes:

 a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

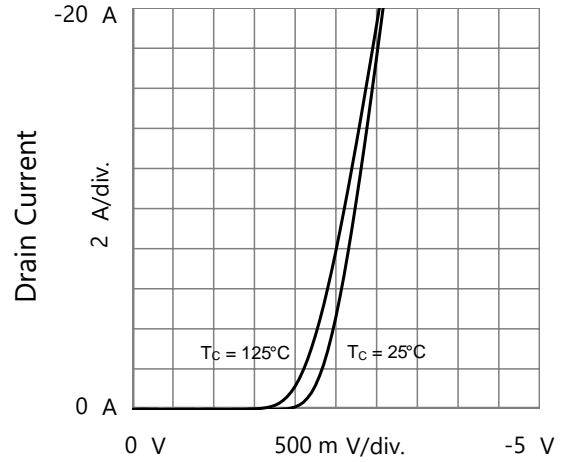
b. Guaranteed by design, not subject to production testing.

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.

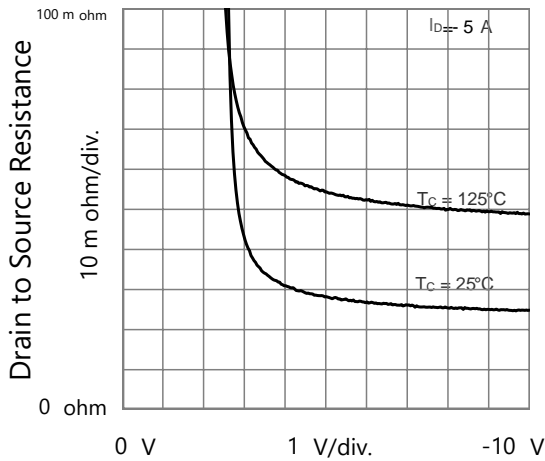
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



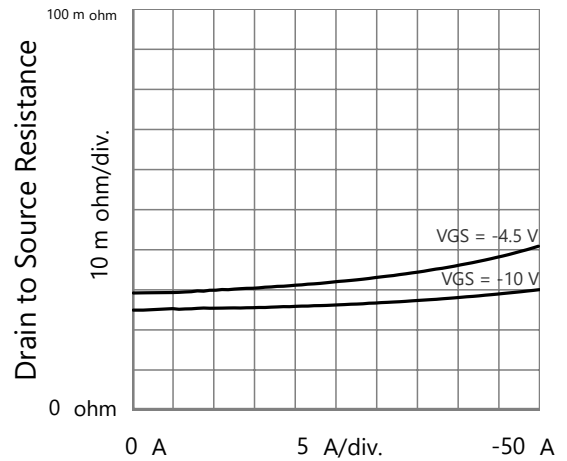
Drain to Source Voltage
Output Characteristics



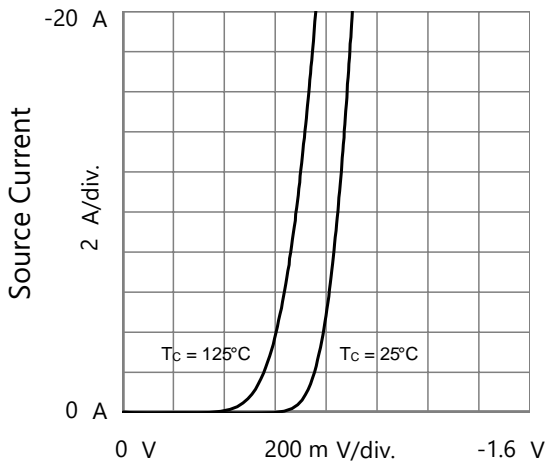
Gate to Source Voltage
Transfer Characteristics



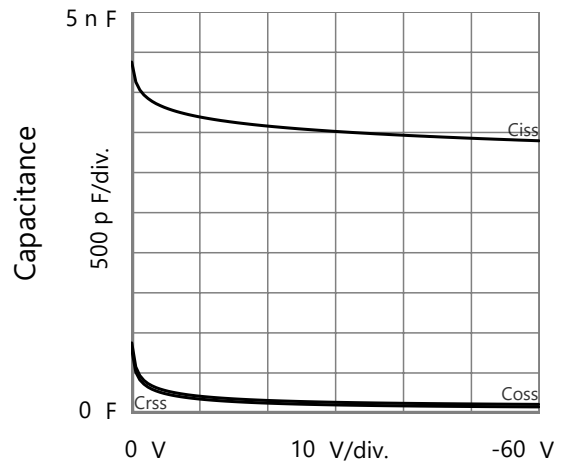
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

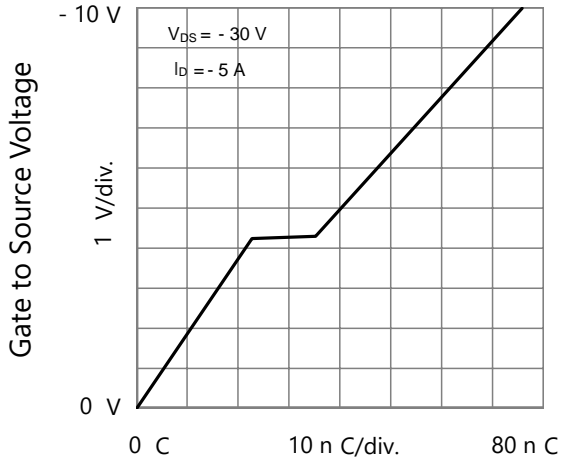


Source to Drain Voltage
Body Diode Forward Characteristics

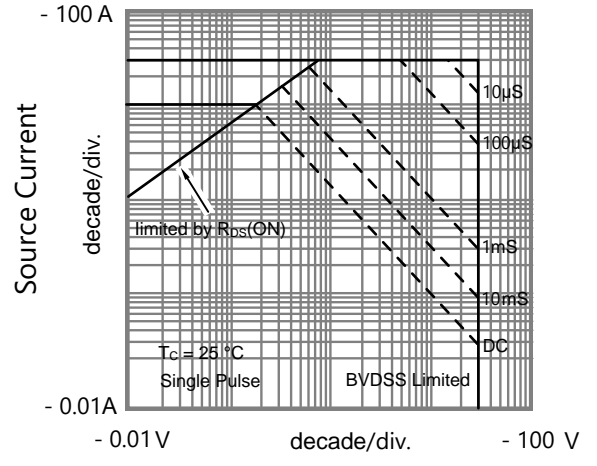


Drain to Source Voltage
Capacitances

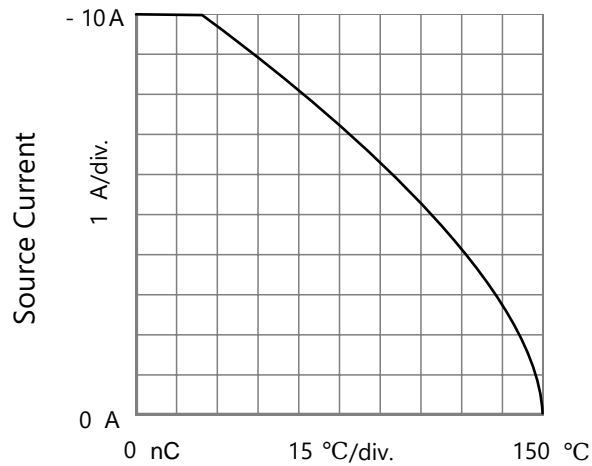
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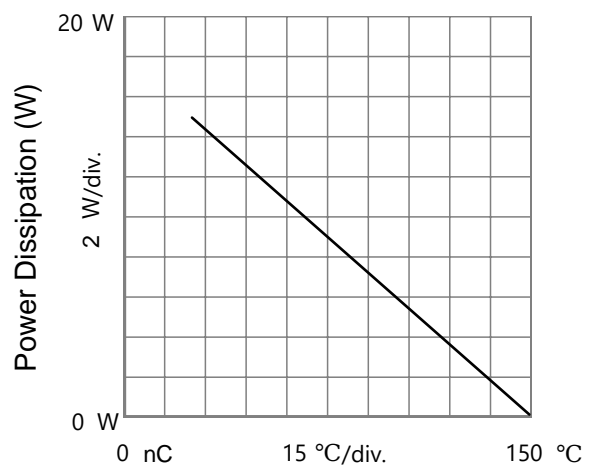
Gate Charge
Gate to Source Voltage vs. Gate Charge



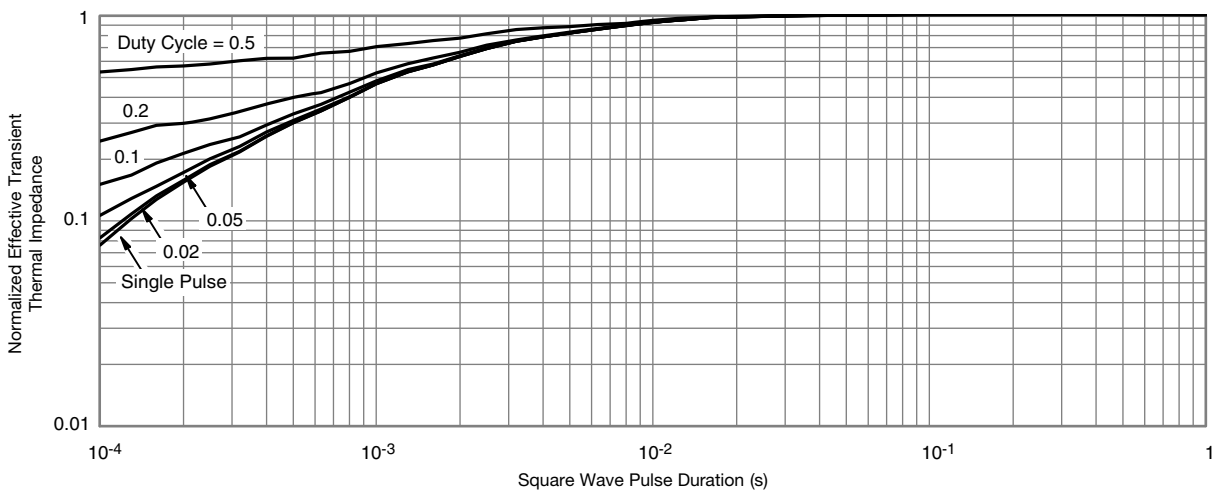
Source to Drain Voltage
Safe Operating Area, Junction-to-Ambient



T_C - Case Temperature



T_C - Case Temperature



Normalized Thermal Transient Impedance, Junction-to-Case

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