P-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[a]	Q_g (Typ.)
-60	55 at V_{GS} = -10 V	- 5	13.5 nC
	70 at V_{GS} = -4.5 V		

FEATURES

- DT-Trench Power MOSFET
- 175 °C Operating Temperature
- Dynamic dV/dt Rating
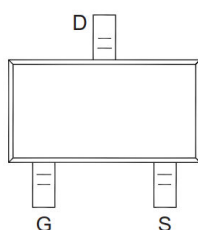- Low Thermal Resistance
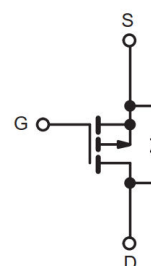- Lead (Pb)-free Available

RoHS COMPLIANT

APPLICATIONS

- Notebook PC Core
- VRM/POL

SOT-23-3L 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}	-60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	-5[b, c]	A
	T_C = 100 °C		-3.6[b, c]	
Pulsed Drain Current		I_{DM}	-20	
Avalanche Current Pulse	L = 0.1 mH	I_{AS}	-5	
Single Pulse Avalanche Energy		E_{AS}	112	mJ
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	-2.5[a]	A
Maximum Power Dissipation	T_A = 25 °C	P_D	25[b, c]	W
	T_A = 100 °C		13[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b]	t ≤ 10 s	R_{thJA}	40	65	°C/W
Maximum Junction-to-Case	Steady State	R_{thJC}	4	5.5	

Notes:
a. Based on T_C = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 10 s.

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	-60			V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250$ µA	-1		-3	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60$ V, $V_{GS} = 0$ V			-100	µA
		$V_{DS} = -60$V, $V_{GS} = 0$ V, $T_J = 150$ °C			-500	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq -5$ V , $V_{GS} = -10$ V	6			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	$V_{GS} = -10$ V, $I_D = -3.2$ A		55	65	mΩ
		$V_{GS} = -10$ V, $I_D = -3.2$ A		70	85	
Forward Transconductance[a]	g_{fs}	$V_{DS} = -25$ V,$I_D = -3.2$ A		4		S
Dynamic[b]						
Input Capacitance	C_{iss}	$V_{DS} = -25$ V,$V_{GS} = 0$ V, f = 1 MHz		1216		pF
Output Capacitance	C_{oss}			82		
Reverse Transfer Capacitance	C_{rss}			43		
Total Gate Charge	Q_g	$V_{DS} = -48$ V,$V_{GS} = -10$ V, $I_D = -3.2$ A		13.5		nC
Gate-Source Charge	Q_{gs}			4		
Gate-Drain Charge	Q_{gd}			6.2		
Gate Resistance	R_g	f = 1 MHz		7.5		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30$ V,$R_L = 2.5$ Ω $I_D \cong -3.2$ A, $V_{GEN} = -10$ V, $R_g = 1$ Ω		13		ns
Rise Time	t_r			60		
Turn-Off Delay Time	$t_{d(off)}$			11		
Fall Time	t_f			30		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_A = 25$ °C			-5	A
Pulse Diode Forward Current[a]	I_{SM}				-20	
Body Diode Voltage	V_{SD}	$I_S = -1$ A		-0.6	-1	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -3.2$ A, di/dt = 100 A/µs, $T_J = 25$ °C		80	160	ns
Body Diode Reverse Recovery Charge	Q_{rr}			90		nC

Notes:
a. Pulse test; pulse width $\leq$ 300 µs, 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.
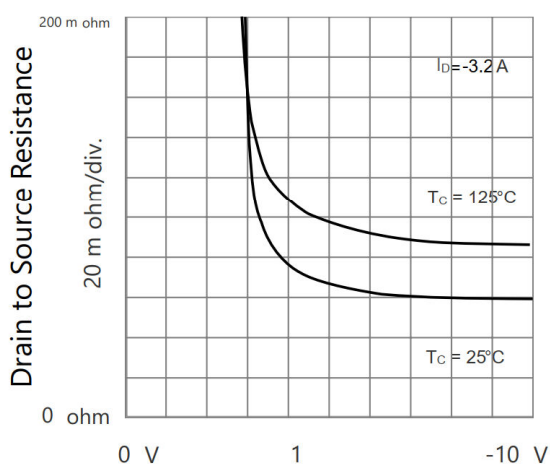
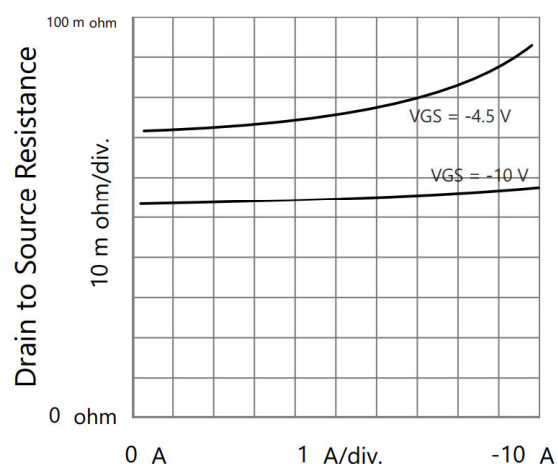**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)
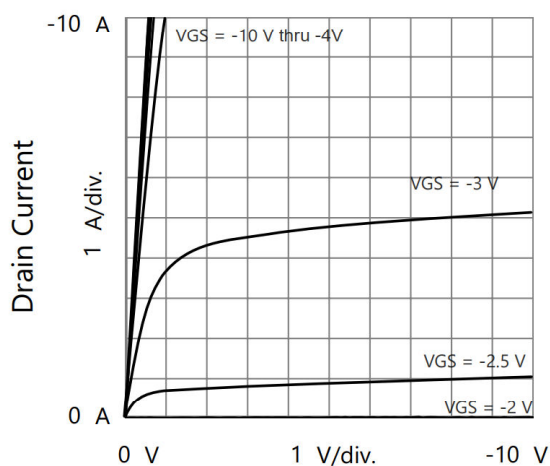
Drain to Source Voltage
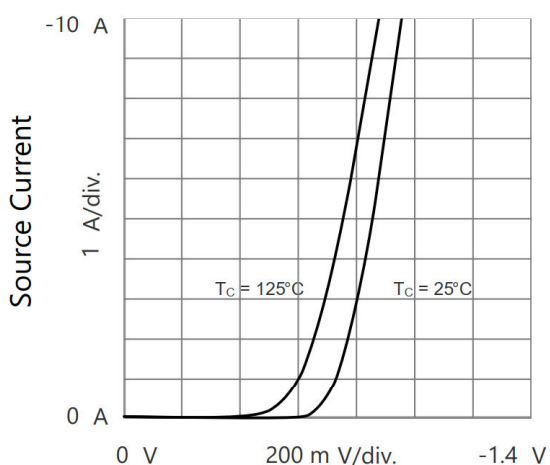Output Characteristics
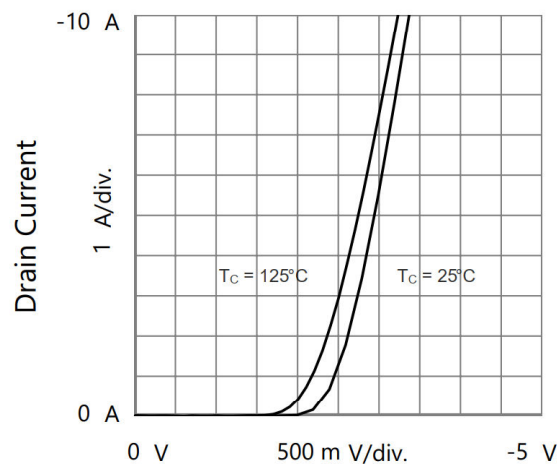
Gate to Source Voltage
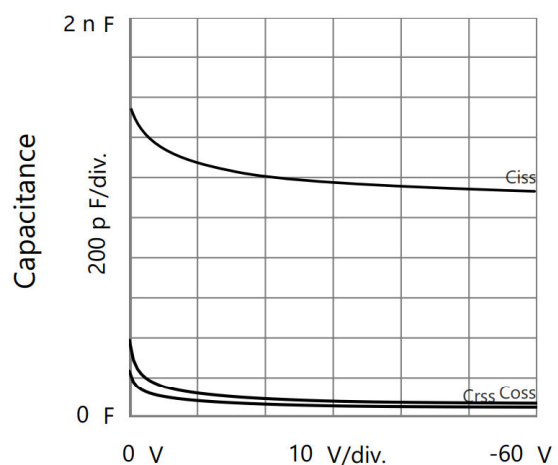Transfer Characteristics

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

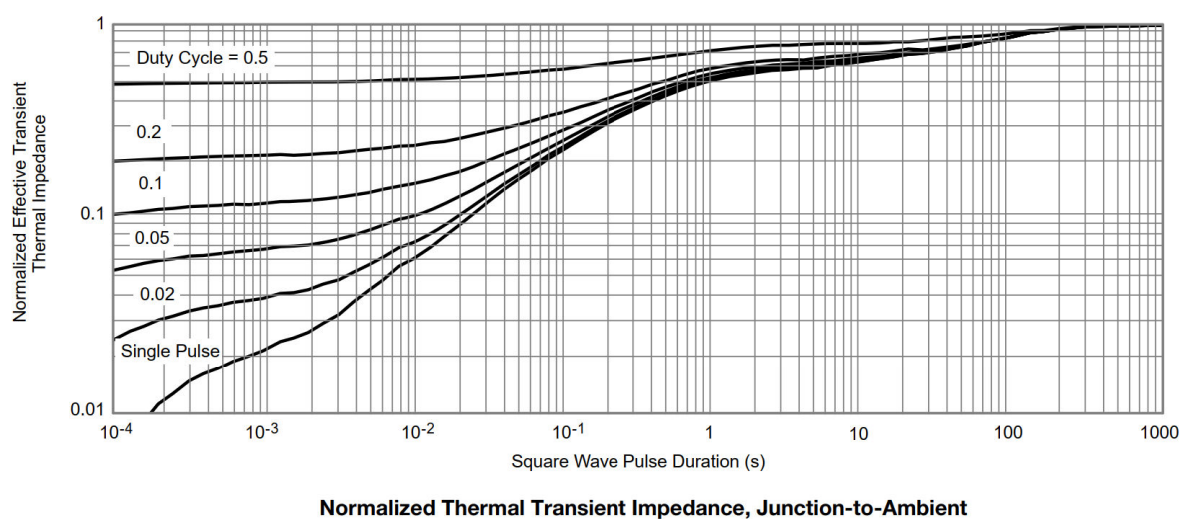Drain Current
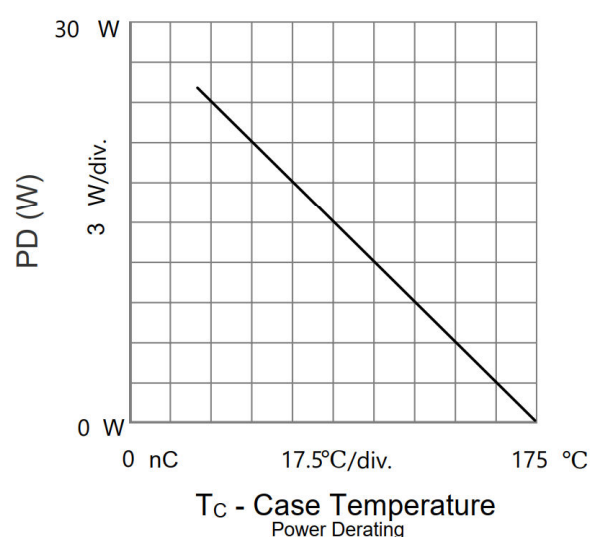Drain to Source Resistance vs. Drain Current

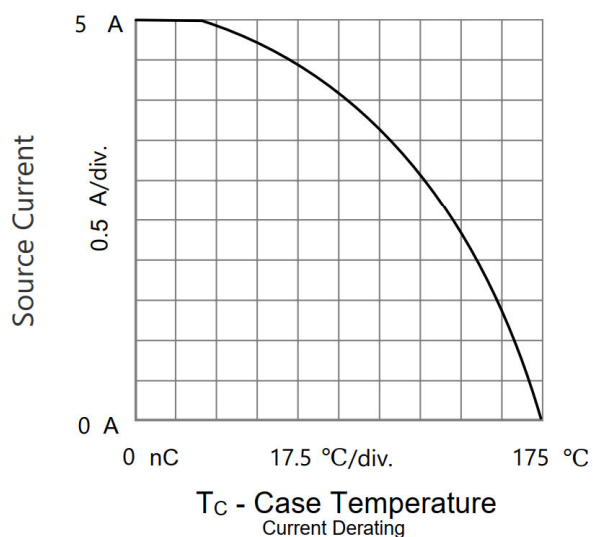Source to Drain Voltage
Body Diode Forward Characteristics

Drain to Source Voltage
Capacitances

TYPICAL CHARACTERISTICS (25 C, unless otherwise noted)

V_{DS} = -48 V
I_D = -3.2 A

Gate Charge
Gate to Source Voltage vs. GateCharge

T_C = 25 °C
Single Pulse   BVDSS Limited

10µS
100µS
1mS
100mS
1S
DC

limited by R_{DS}(ON)

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

T_C - Case Temperature
Current Derating

T_C - Case Temperature
Power Derating

Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse

Square Wave Pulse Duration (s)

Normalized Thermal Transient Impedance, Junction-to-Ambient

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