N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (mA)	Q_g (Typ.)
60	1.0 at V_{GS} = 10 V	360	0.45nC
	1.2 at V_{GS} = 4.5 V	340	

FEATURES

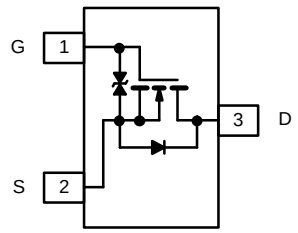
- DT-Trench Power MOSFET: 1.2 V Rated
- 100 % R_g Tested
- Small package
- High-speed switching
- Gate-Source ESD Protected

Pb-free
RoHS COMPLIANT

APPLICATIONS

- Load/Power Switching for Portable Devices
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits

SOT-723



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)[a]	T_A = 25 °C	I_D	360[a, b]	mA
	T_A = 70 °C		330[a, b]	
Pulsed Drain Current (t = 300 µs)		I_{DM}	1420	
Continuous Source-Drain Diode Current	T_A = 25 °C	I_S	360[a, b]	mA
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	240[a, b]	mW
	T_A = 70 °C		153.6[a, b]	
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[b]	t ≤ 5 s	R_{thJA}	440	530	°C/W
	Steady State		540	650	

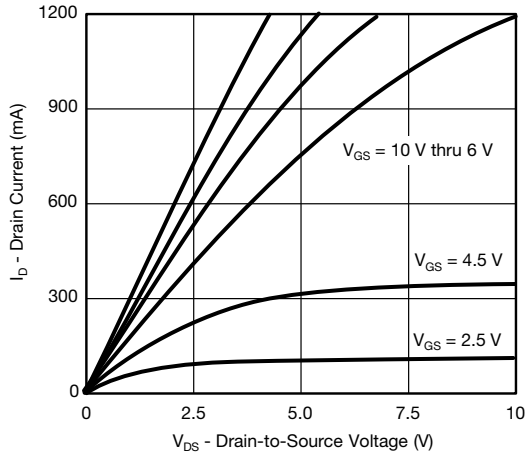
Notes:
a. Surface mounted on 1" x 1" FR4 board.
b. t = 5 s.

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
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA		25		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 1.8		
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} = ± 20 V			± 10	µA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 85 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = ≥ 5 V, V_{GS} = 10 V	2			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 300 mA		1.0	1.5	Ω
		V_{GS} = 4.5 V, I_D = 300 mA		1.2	2.0	
Forward Transconductance	g_{fs}	V_{DS} = 10 V, I_D = 300 mA		250		mS
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz		23		pF
Output Capacitance	C_{oss}			10		
Reverse Transfer Capacitance	C_{rss}			3		
Total Gate Charge	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 300 mA		4.3		nC
Gate-Source Charge	Q_{gs}			0.15		
Gate-Drain Charge	Q_{gd}			0.11		
Gate Resistance	R_g	f = 1 MHz		8.5		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, R_L = 20 Ω I_D ≅ 300 mA, V_{GEN} = 10 V, R_g = 1 Ω		4.5		ns
Rise Time	t_r			4.9		
Turn-Off Delay Time	$t_{d(off)}$			20		
Fall Time	t_f			11		
Drain-Source Body Diode Characteristics						
Pulse Diode Forward Current[a]	I_{SM}				360	mA
Body Diode Voltage	V_{SD}	I_S = 300 mA		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 300 mA, dI/dt = 100 A/µs		10	15	ns
Body Diode Reverse Recovery Charge	Q_{rr}			2	4	nC
Reverse Recovery Fall Time	t_a			5		ns
Reverse Recovery Rise Time	t_b			5		

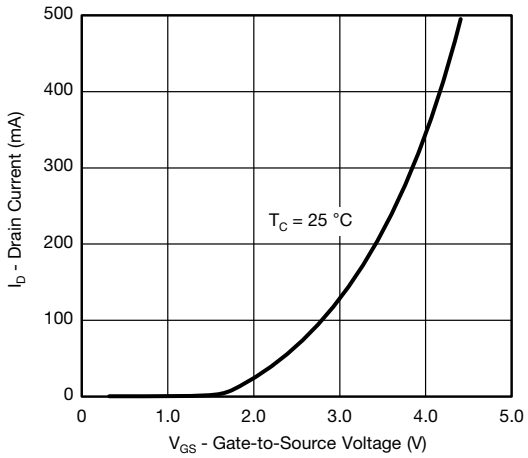
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

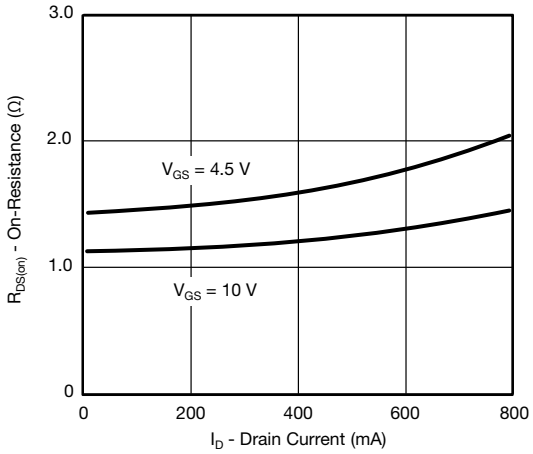
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



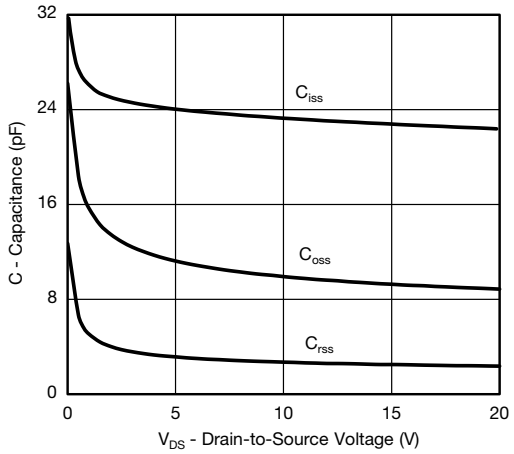
Output Characteristics



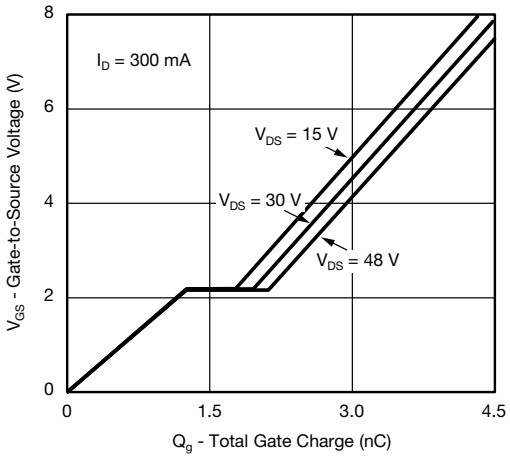
Transfer Characteristics



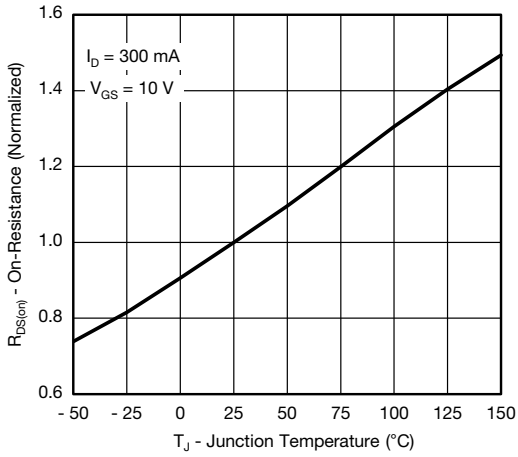
On-Resistance vs. Drain Current



Capacitance

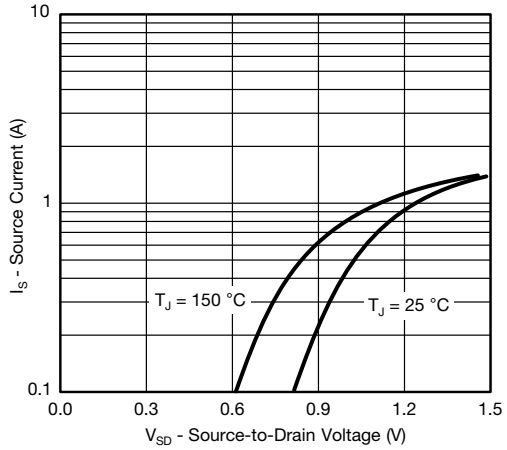


Gate Charge

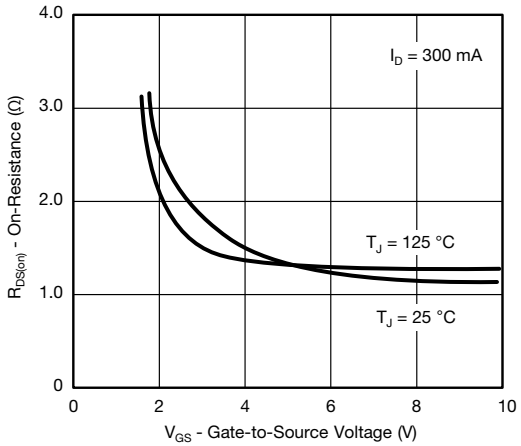


On-Resistance vs. Junction Temperature

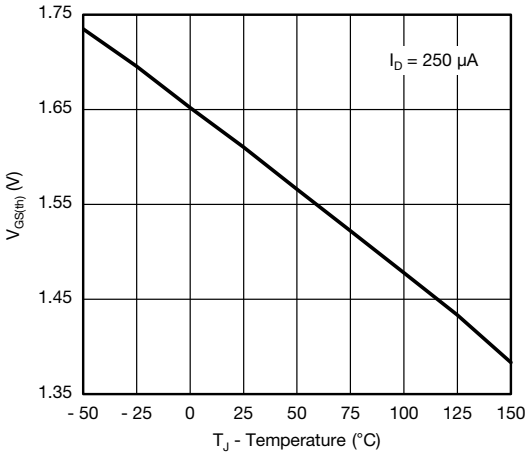
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



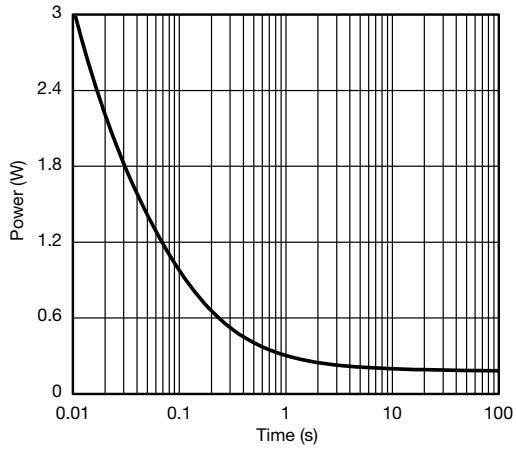
Soure-Drain Diode Forward Voltage



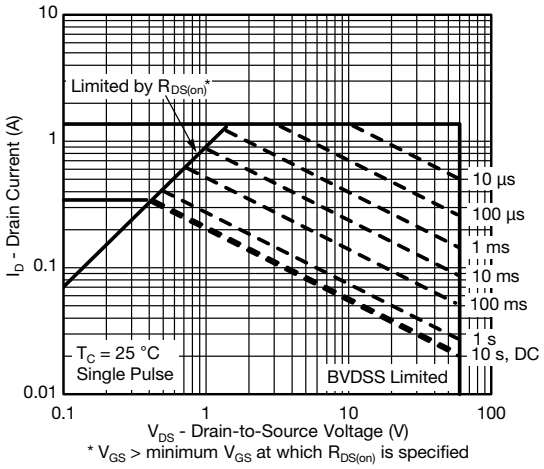
On-Resistance vs. Gate-to-Source Voltage



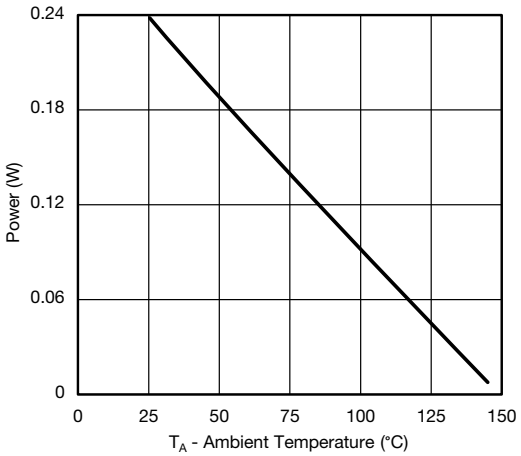
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

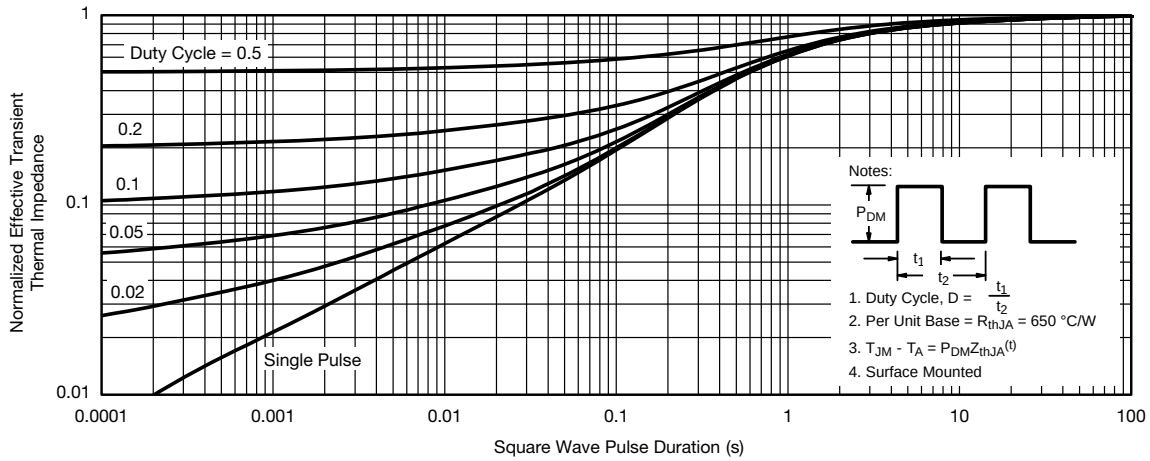


Safe Operating Area, Junction-to-Ambient



Power Derating, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max.)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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