P-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ) (Typ.)	I_D (A)[a]	Q_g (Typ.)
- 40	2.9 at V_{GS} = - 10 V	- 110	42 nC
	4.1 at VGS= - 4.5 V	- 90	

FEATURES

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

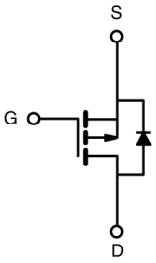
APPLICATIONS

- Load Switch

RoHS COMPLIANT

TO-263

Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current [d] (T_J = 175 °C)	T_C = 25 °C	I_D	-110	A
	T_C = 125 °C		-97	
Pulsed Drain Current		I_{DM}	- 440	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	-100	
Single Pulse Avalanche Energy [a]		E_{AS}	80	mJ
Power Dissipation	T_C = 25 °C [c]	P_D	134	W
	T_A = 25 °C [b]		3.57	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	TYPICAL	UNIT
Junction-to-Ambient	PCB mount [b]	R_{thJA}	60	°C/W
Junction-to-Case		R_{thJC}	0.8	

Notes

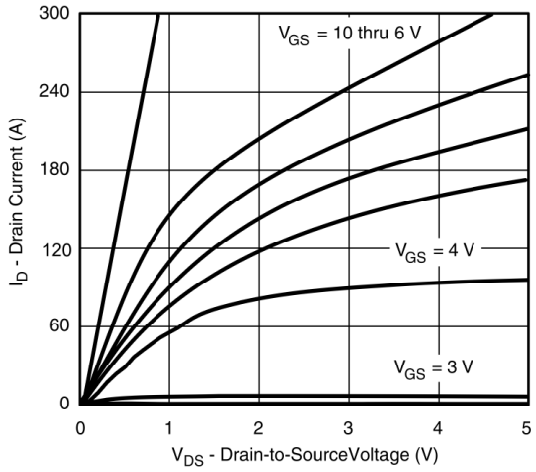
a. Duty cycle ≤ 1 %.
b. When mounted on 1" square PCB (FR4 material).
c. See SOA curve for voltage derating.

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	- 40			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T$	I_D = - 250 µA		65		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.3		
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			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 40 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 32 V, V_{GS} = 0 V, T_J = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = - 5 V, V_{GS} = - 10 V	- 110			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 50 A		2.9	3.5	mΩ
		V_{GS} = - 4.5 V, I_D = - 50 A		4.1	5.3	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 50 A		80		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 20 V, V_{GS} = 0 V, f = 1 MHz		11000		pF
Output Capacitance	C_{oss}			3200		
Reverse Transfer Capacitance	C_{rss}			105		
Total Gate Charge	Q_g	V_{DS} = - 20 V, V_{GS} = - 10 V, I_D = - 50 A		169		nC
Gate-Source Charge	Q_{gs}			14		
Gate-Drain Charge	Q_{gd}			30		
Gate Resistance	R_g	f = 1 MHz		5.2		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 20 V, R_L = 2 Ω I_D = - 50 A, V_{GEN} = - 10 V, R_g = 1 Ω		25		ns
Rise Time	t_r			18		
Turn-Off Delay Time	$t_{d(off)}$			162		
Fall Time	t_f			60		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			- 110	A
Pulse Diode Forward Current[a]	I_{SM}				- 440	
Body Diode Voltage	V_{SD}	I_S = - 1 A		- 0.65	- 1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 50 A, di/dt = 100 A/µs, T_J = 25 °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		

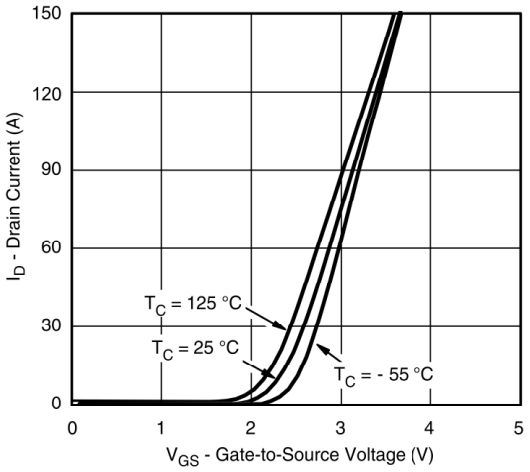
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

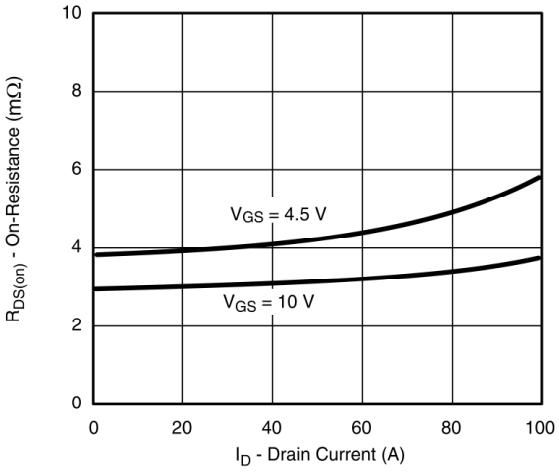
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



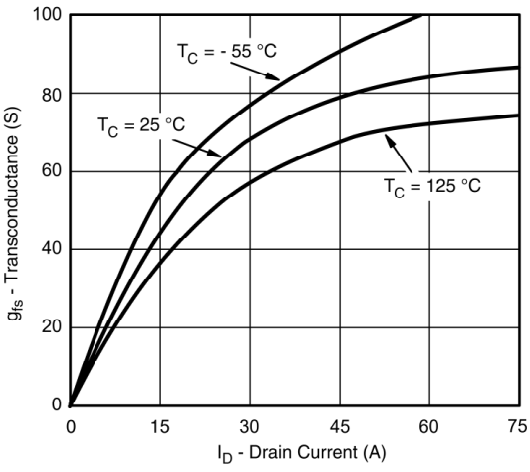
Output Characteristics



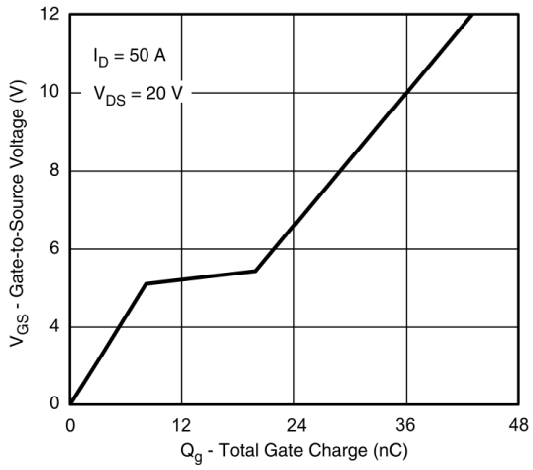
Transfer Characteristics



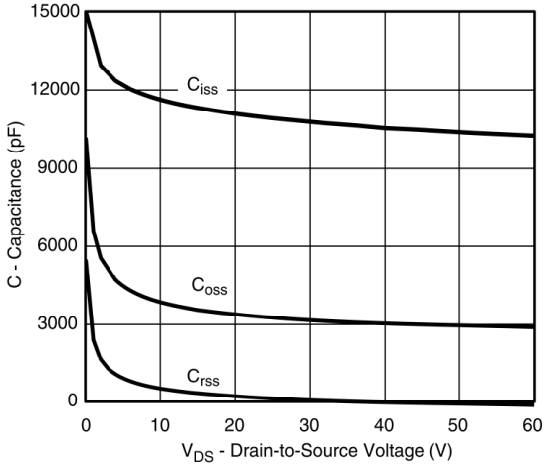
On-Resistance vs. Drain Current



Transconductance

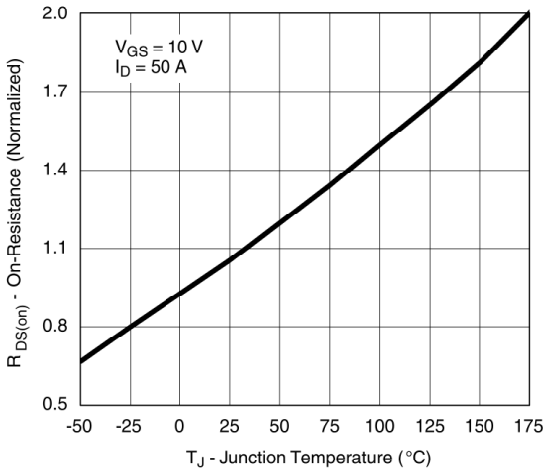


Gate Charge

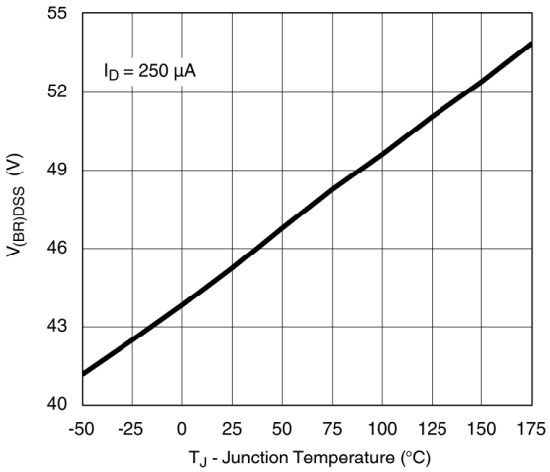


Capacitance

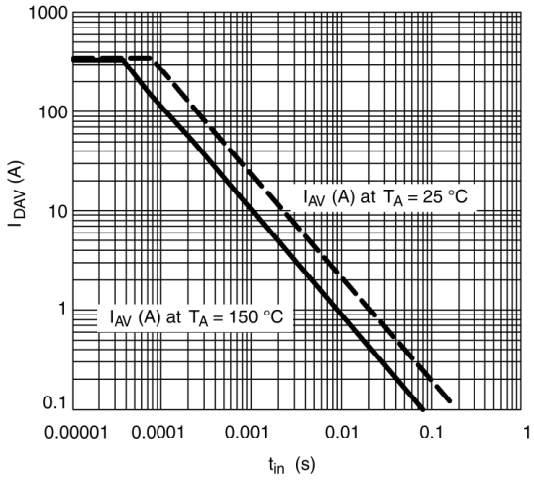
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



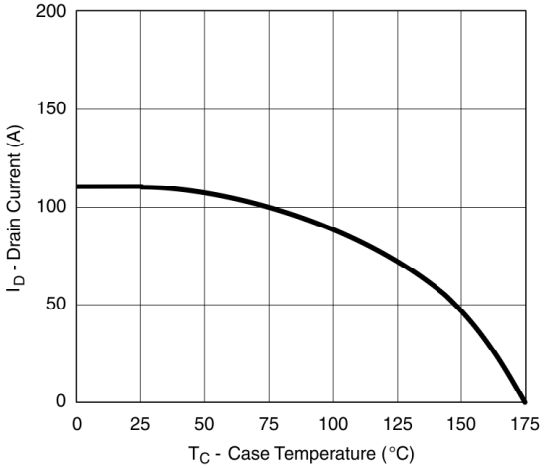
On-Resistance vs. Junction Temperature



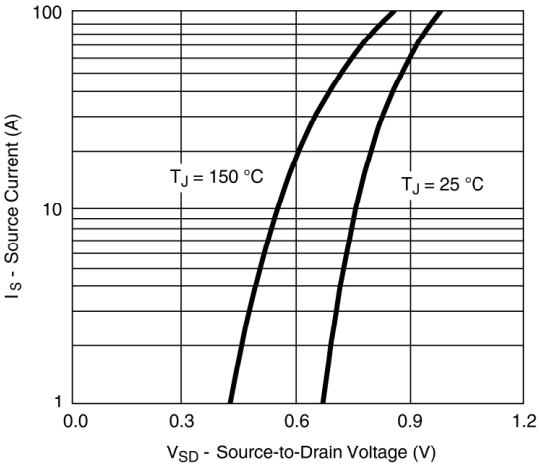
Drain Source Breakdown vs. Junction Temperature



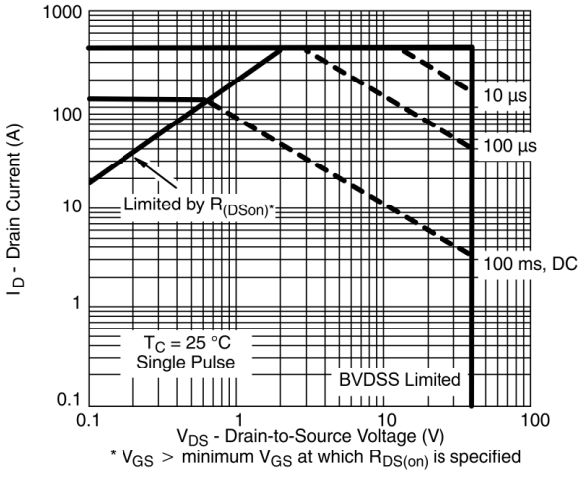
Avalanche Current vs. Time



Maximum Avalanche and Drain Current vs. Case Temperature

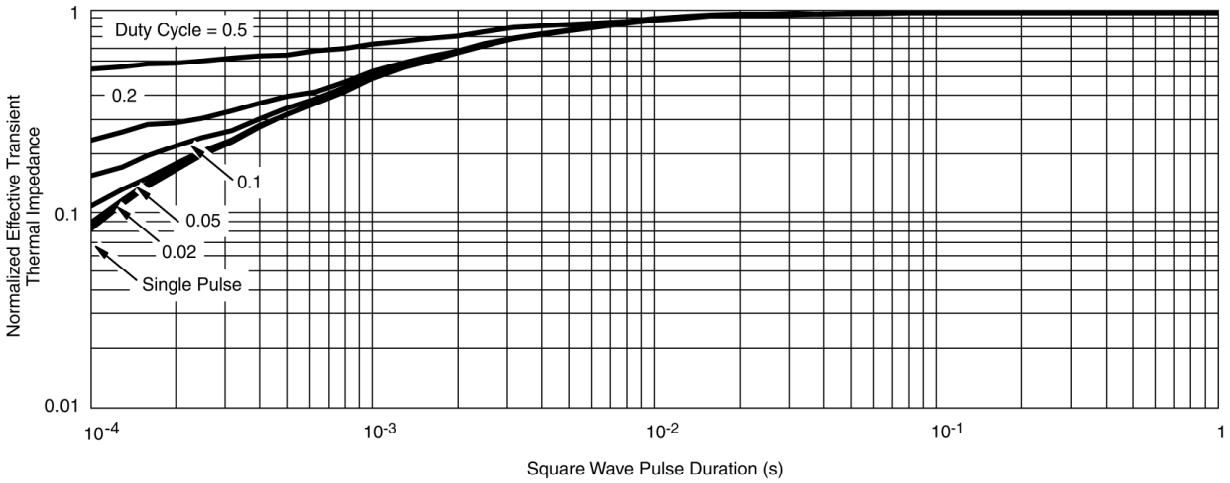


Source-Drain Diode Forward Voltage



Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case

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