

P-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ.)
- 60	0.0078 at $V_{GS} = - 10$ V	- 98	141 nC
	0.0098 at $V_{GS} = - 4.5$ V	- 80	

FEATURES

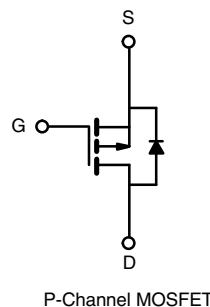
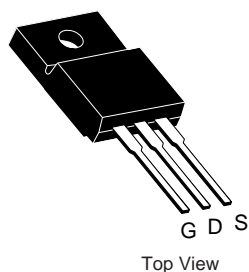
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested



APPLICATIONS

- Load Switch

TO-220 FULLPAK



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)	I_D	$T_C = 25$ °C	A
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Pulsed Drain Current	I_{DM}	- 320	A
Avalanche Current Pulse	I_{AS}	- 90	
Single Pulse Avalanche Energy	E_{AS}	320	mJ
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	A
		$T_A = 25$ °C	
Maximum Power Dissipation	P_D	$T_C = 25$ °C	W
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °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 ^b	R_{thJA}	35	65	°C/W
Maximum Junction-to-Case	R_{thJC}	0.35	0.62	

Notes:

a. Based on $T_C = 25$ °C.

b. Surface mounted on 1" x 1" FR4 board.

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	ΔV _{DS} /T _J	I _D = - 250 μA		38		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 5.2		
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} = - 48 V, V _{GS} = 0 V			- 1	μA
		V _{DS} = - 48 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	- 98			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 30 A		0.0078	0.0096	Ω
		V _{GS} = - 4.5 V, I _D = - 20 A		0.0098	0.0126	
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 50 A		20		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = - 48 V, V _{GS} = 0 V, f = 1 MHz		8500		pF
Output Capacitance	C _{oss}			490		
Reverse Transfer Capacitance	C _{rss}			280		
Total Gate Charge	Q _g	V _{DS} = - 48 V, V _{GS} = - 10 V, I _D = - 30 A		141		nC
		V _{DS} = - 48 V, V _{GS} = - 4.5 V, I _D = - 20 A		39		
Gate-Source Charge	Q _{gs}			16		
Gate-Drain Charge	Q _{gd}			23		
Gate Resistance	R _g	f = 1 MHz		4.5		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 48 V, R _L = 2 Ω I _D ≅ - 10 A, V _{GEN} = - 10 V, R _g = 1 Ω		70		ns
Rise Time	t _r			155		
Turn-Off Delay Time	t _{d(off)}			210		
Fall Time	t _f			160		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			- 98	A
Pulse Diode Forward Current ^a	I _{SM}				- 320	
Body Diode Voltage	V _{SD}	I _S = - 30 A		- 0.7	- 1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = - 50 A, di/dt = 100 A/μs, T _J = 25 °C		48		ns
Body Diode Reverse Recovery Charge	Q _{rr}			59		nC
Reverse Recovery Fall Time	t _a			29		ns
Reverse Recovery Rise Time	t _b			12		

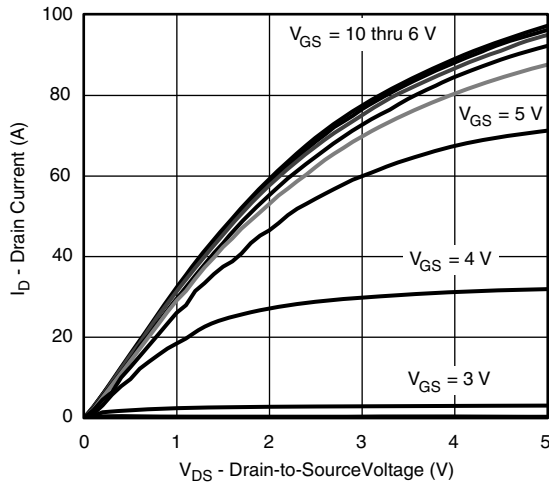
Notes:

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

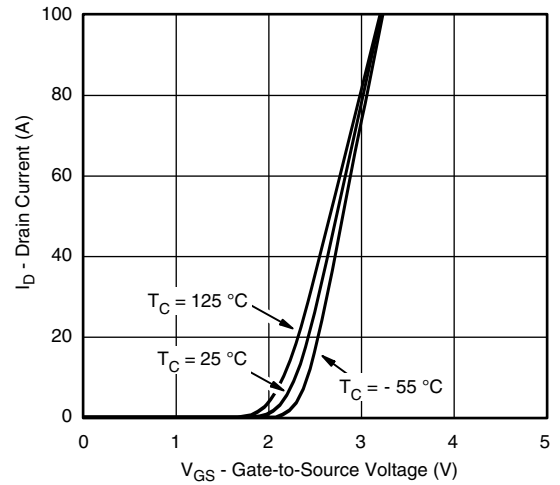
b. Guaranteed by design, not subject to production testing.

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.

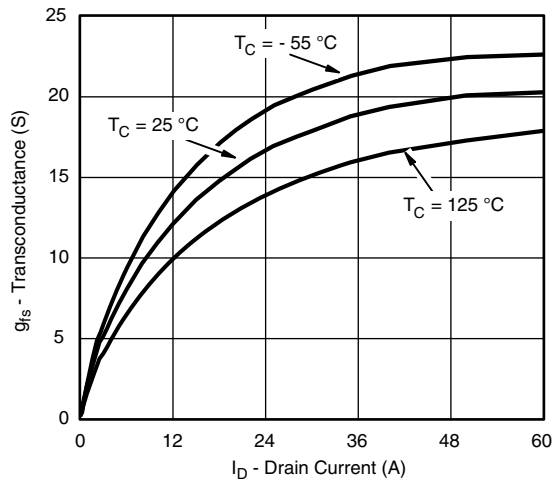
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



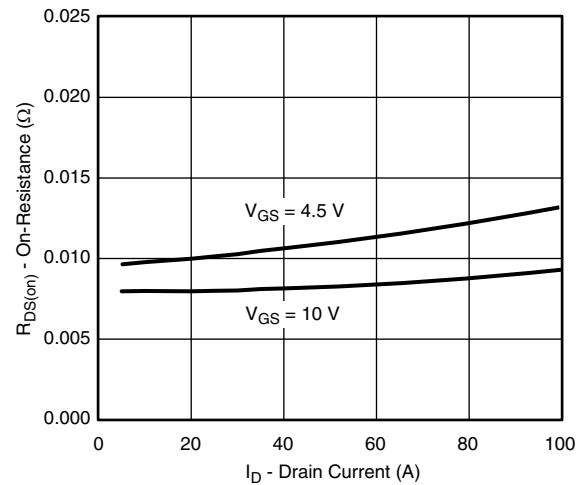
Output Characteristics



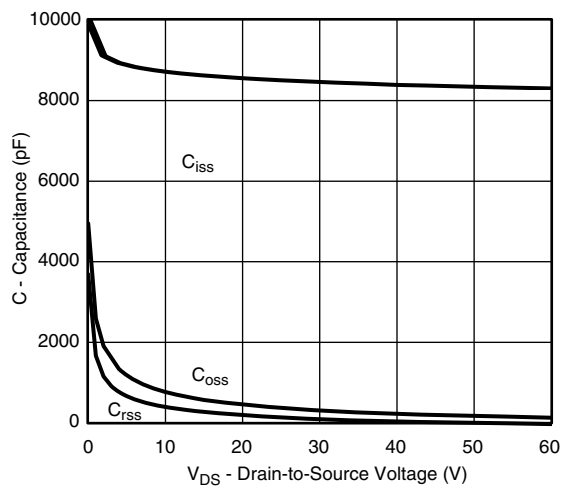
Transfer Characteristics



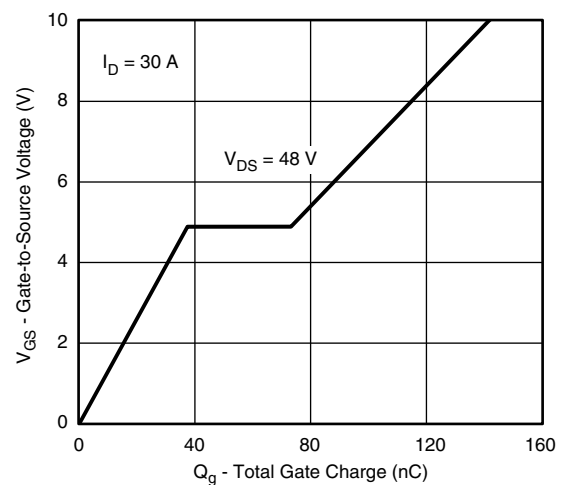
Transconductance



On-Resistance vs. Drain Current

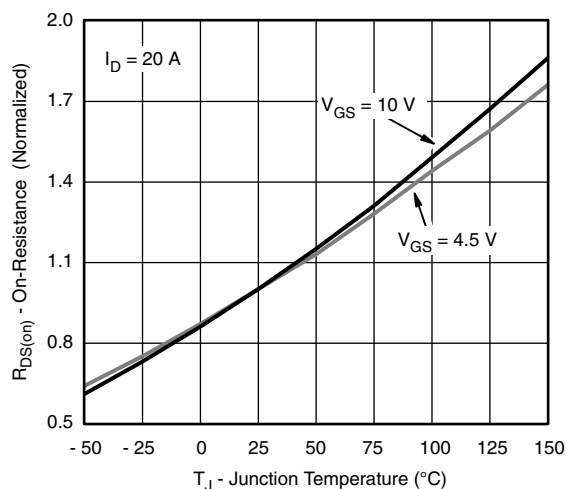


Capacitance

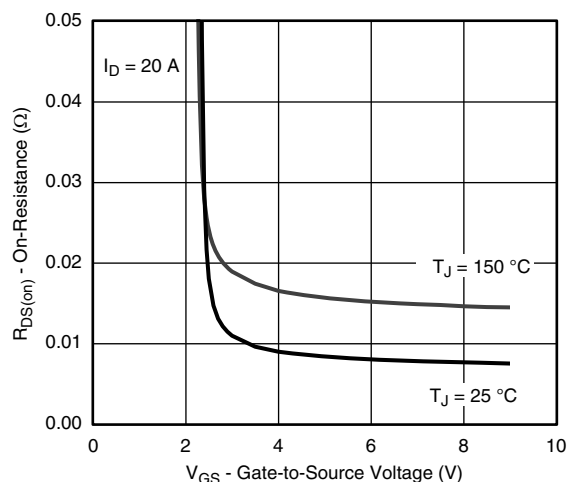


Gate Charge

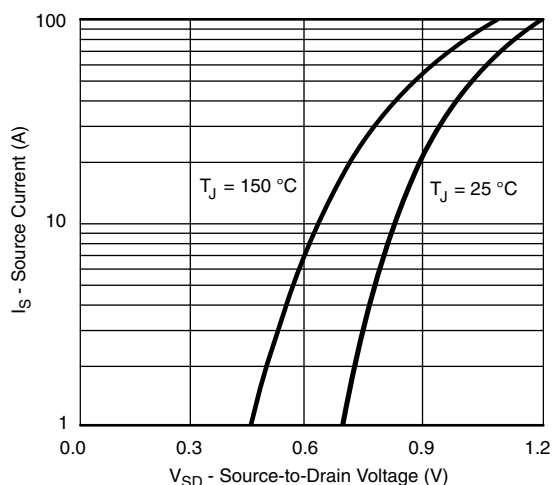
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



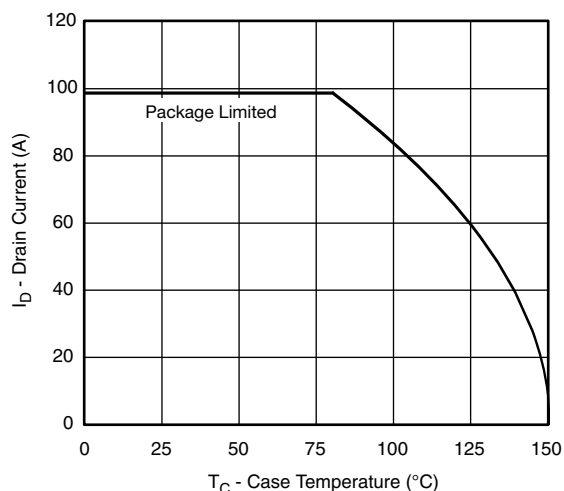
On-Resistance vs. Gate-to-Source Voltage



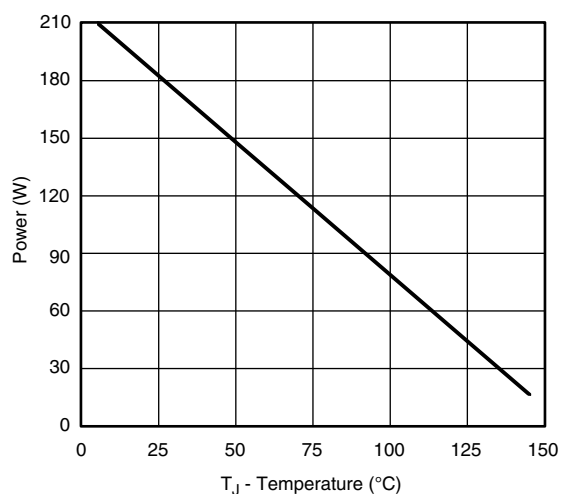
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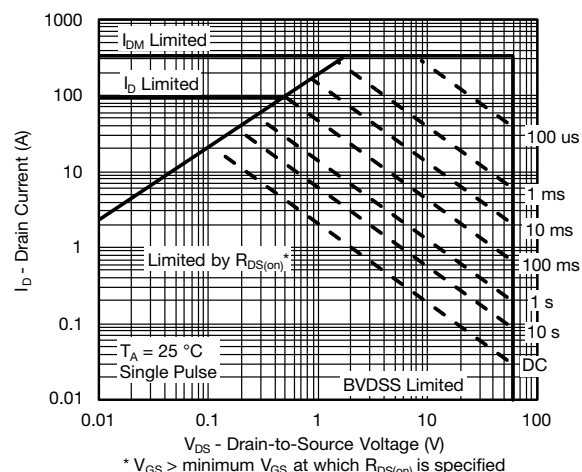
Source-Drain Diode Forward Voltage



Max. Drain Current vs. Case Temperature

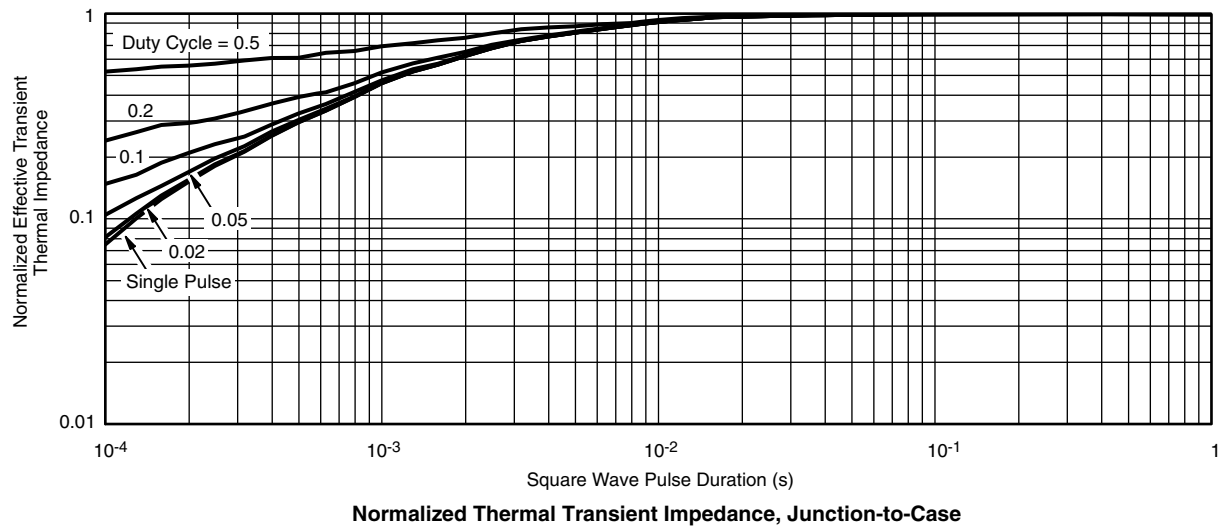


Power Derating, Junction-to-Case



Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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