

N-Channel 250-V (D-S) MOSFET

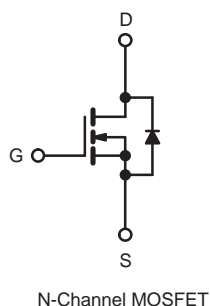
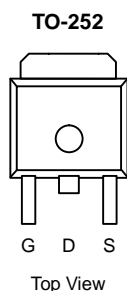
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
250	0.220 @ $V_{GS} = 10$ V	14
	0.260 @ $V_{GS} = 4.5$ V	13

FEATURES

- Surface Mount
- Low-Profile Through-Hole
- Available in Tape and Reel
- Dynamic dV/dt Rating
- 150 °C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Compliant to RoHS Directive 2002/95/EC



RoHS*
COMPLIANT



ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)					
PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V _{DS}	250	V
Gate-Source Voltage			V _{GS}	± 20	
Continuous Drain Current	V _{GS} at 10 V	T _C = 25 °C	I _D	14	A
		T _C = 100 °C		10	
Pulsed Drain Current ^{a, e}			I _{DM}	45	
Single Pulse Avalanche Energy ^{b, e}			E _{AS}	380	mJ
Avalanche Current ^a			I _{AR}	10	A
Repetiitive Avalanche Energy ^a			E _{AR}	186	mJ
Maximum Power Dissipation	T _C = 25 °C		P _D	156	W
	T _A = 25 °C			3.3	
Peak Diode Recovery dV/dt ^{c, e}			dV/dt	5.0	V/ns
Operating Junction and Storage Temperature Range			T _J , T _{stg}	- 55 to + 175	°C
Soldering Recommendations (Peak Temperature)	for 10 s			300 ^d	

Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- $V_{DD} = 50$ V, starting $T_J = 25$ °C, $L = 2.7$ mH, $R_g = 25$ Ω , $I_{AS} = 12$ A (see fig. 12).
- $I_{SD} \leq 20$ A, $dI/dt \leq 150$ A/ μ s, $V_{DD} \leq V_{DS}$, $T_J \leq 150$ °C.
- 1.6 mm from case.

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient (PCB Mounted, Steady-State) ^a	R_{thJA}	-	50	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	-	1.0	

Note

a. When mounted on 1" square PCB (FR-4 or G-10 material).

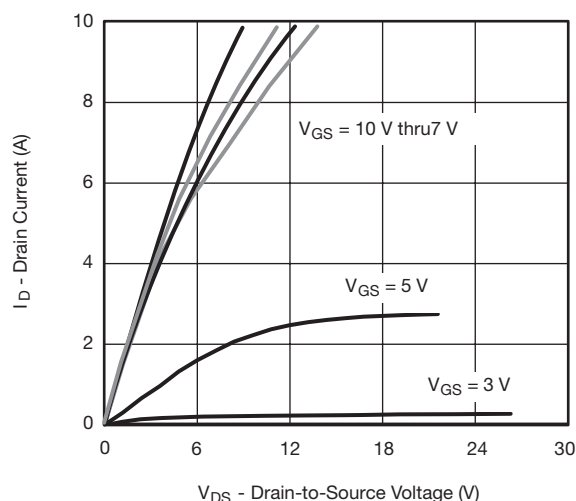
SPECIFICATIONS ($T_J = 25\text{ °C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	250	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA ^c	-	0.29	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.0	-	4.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 250 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 200 V, V _{GS} = 0 V, T _J = 125 °C	-	-	10	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V I _D = 7 A	-	220	300	mΩ
		V _{GS} = 4.5 V I _D = 5 A		260	390	
Forward Transconductance	g _{fs}	V _{DS} = 50 V, I _D = 7 A	-	10	-	S
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V	-	735	-	pF
Output Capacitance	C _{oss}		-	130	-	
Reverse Transfer Capacitance	C _{rss}		-	10	-	
Total Gate Charge	Q _g	V _{GS} = 10 V, V _{DS} = 125 V, I _D =7 A	-	15	-	nC
Gate-Source Charge	Q _{gs}		-	4	-	
Gate-Drain Charge	Q _{gd}		-	5	-	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 125 V, I _D = 7 A, R _g = 9.1 Ω	-	24	-	ns
Rise Time	t _r		-	61	-	
Turn-Off Delay Time	t _{d(off)}		-	45	-	
Fall Time	t _f		-	39	-	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	Maximum Body-Diode Continuous Current	-	-	14	A
Pulsed Diode Forward Current ^a	I _{SM}	Maximum Body-Diode Pulsed Current	-	-	45	
Body Diode Voltage	V _{SD}	I _S = 1 A, V _{GS} = 0 V	-	-	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 14 A, dI/dt = 100A/μs, V _{DS} = 100 V	-	150	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	1.4	-	μC

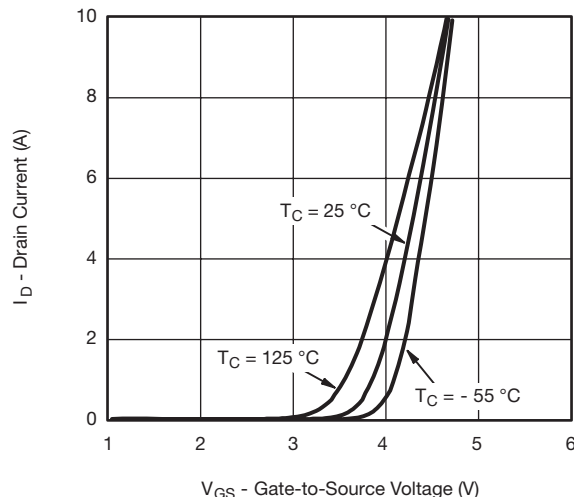
Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- Pulse width $\leq 300\text{ }\mu\text{s}$; duty cycle $\leq 2\%$.
- Uses IRF640/SiHF640 data and test conditions.

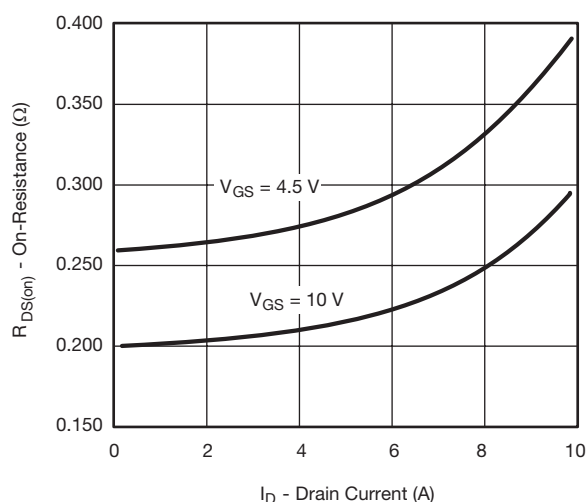
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



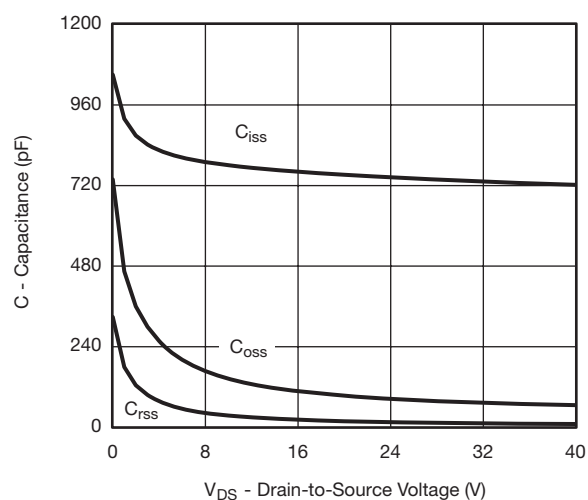
Output Characteristics



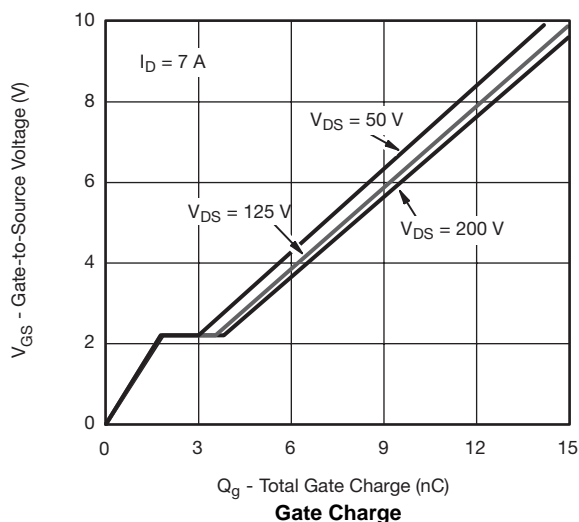
Transfer Characteristics



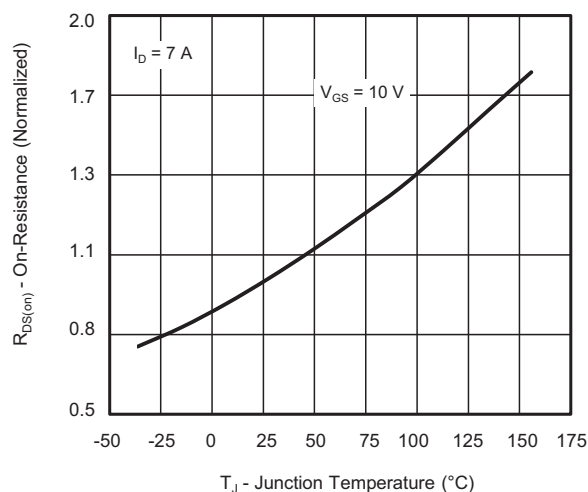
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

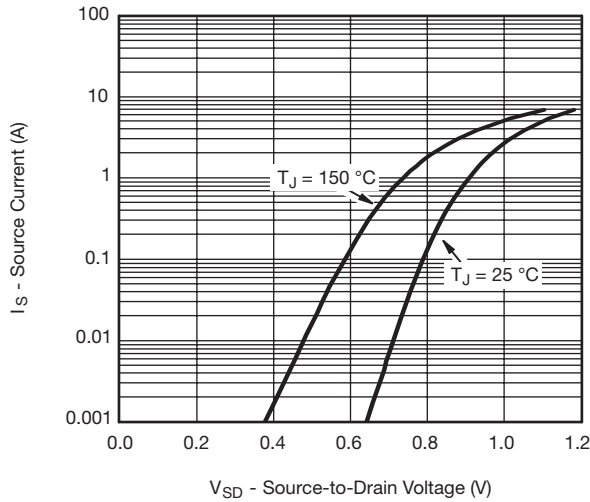


Gate Charge

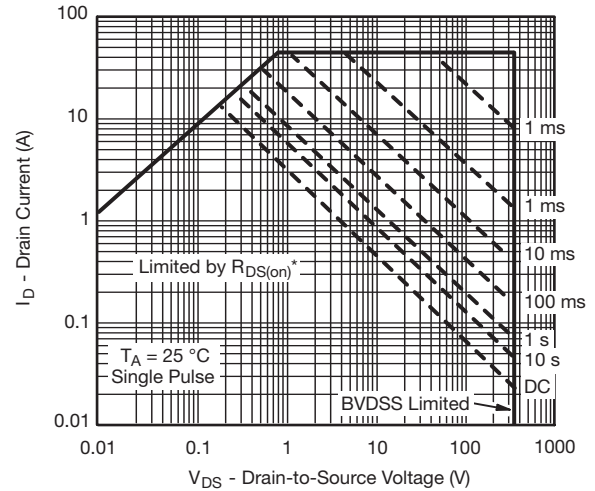


On-Resistance vs. Junction Temperature

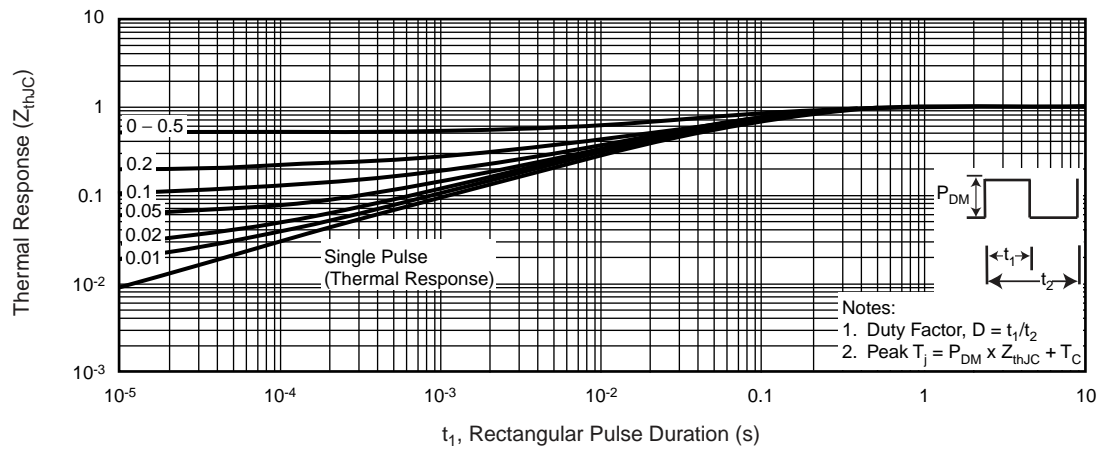
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Source-Drain Diode Forward Voltage



Safe Operating Area, Junction-to-Ambient



Maximum Effective Transient Thermal Impedance, Junction-to-Case

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