

N-Channel 60 V (D-S) Super Junction Power MOSFET

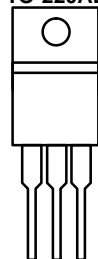
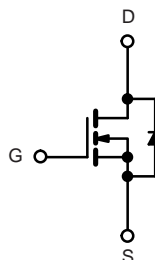
PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a
60	0.0026 at $V_{GS} = 10$ V	150
	0.0042 at $V_{GS} = 4.5$ V	110

FEATURES

- 175 °C Junction Temperature
- DT-Trench Power MOSFET
- Material categorization:


RoHS
 COMPLIANT

TO-220AB

 G D S
 Top View


N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ($T_J = 175$ °C) ^b	$T_C = 25$ °C	I_D	150	A
	$T_C = 100$ °C		110 ^a	
Pulsed Drain Current		I_{DM}	600	
Continuous Source Current (Diode Conduction)		I_S	150 ^a	
Avalanche Current		I_{AS}	110	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	$L = 0.1$ mH	E_{AS}	750	mJ
Maximum Power Dissipation	$T_C = 25$ °C	P_D	210	W
	$T_A = 25$ °C		3.5 ^b , 9.2 ^{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 ^a	$t \leq 10$ sec	R_{thJA}	13	18	°C/W
	Steady State		35	45	
Maximum Junction-to-Case		R_{thJC}	0.8	1.0	

Notes:

a. Package limited.

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

 c. $t \leq 10$ s.

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

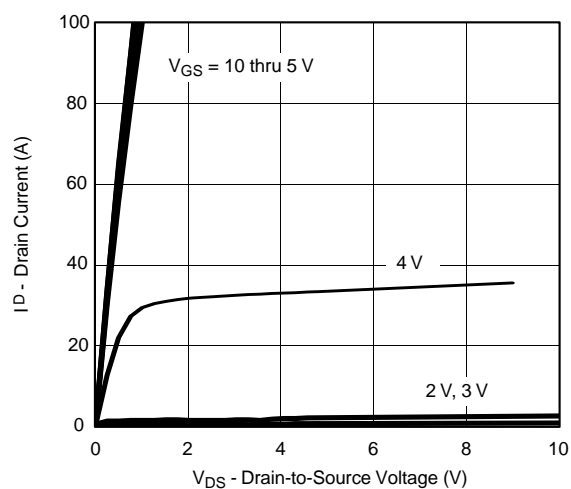
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	60			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		2.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate 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 = 125 °C			50	
		V _{DS} = 48 V, V _{GS} = 0 V, T _J = 175 °C			250	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	150			A
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0026	0.0032	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.0032	0.0041	
		V _{GS} = 10 V, I _D = 10 A, T _J = 175 °C		0.0036	0.0048	
		V _{GS} = 4.5 V, I _D = 15 A		0.0042	0.0050	
Forward Transconductance ^b	g _{fs}	V _{DS} = 48 V, I _D = 20 A		50		S
Dynamic						
Input Capacitance	C _{iSS}	V _{GS} = 0 V, V _{DS} = 48 V, f = 1 MHz		3950		pF
Output Capacitance	C _{oSS}			670		
Reverse Transfer Capacitance	C _{rSS}			23		
Total Gate Charge ^c	Q _g	V _{DS} = 48 V, V _{GS} = 10 V, I _D = 20 A		67	78	nC
Gate-Source Charge ^c	Q _{gs}			12		
Gate-Drain Charge ^c	Q _{gd}			8.5		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 48 V, R _L = 0.6 Ω I _D ≅ 20 A, V _{GEN} = 10 V, R _g = 2.5 Ω		10	20	ns
Rise Time ^c	t _r			5	15	
Turn-Off Delay Time ^c	t _{d(off)}			55	70	
Fall Time ^c	t _f			12	20	
Source-Drain Diode Ratings and Characteristics (T _C = 25 °C)						
Pulsed Current	I _{SM}				150	A
Diode Forward Voltage	V _{SD}	I _F = 20 A, V _{GS} = 0 V		1	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		45	100	ns

Notes:

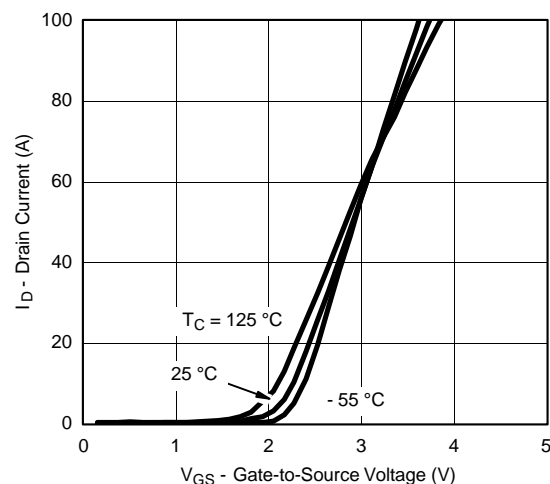
- a. For design aid only; not subject to production testing.
 b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 c. Independent of operating temperature.

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.

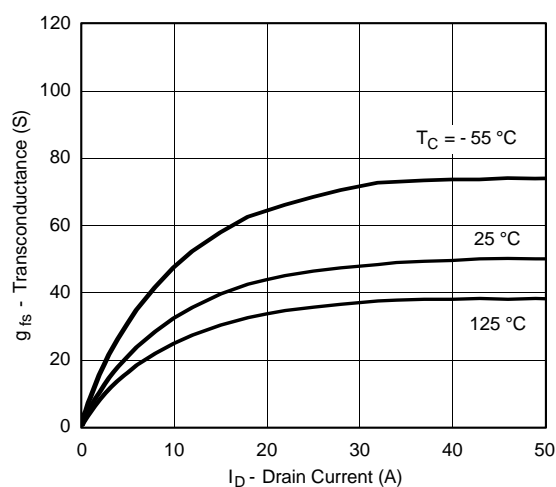
TYPICAL CHARACTERISTICS (25 °C unless noted)



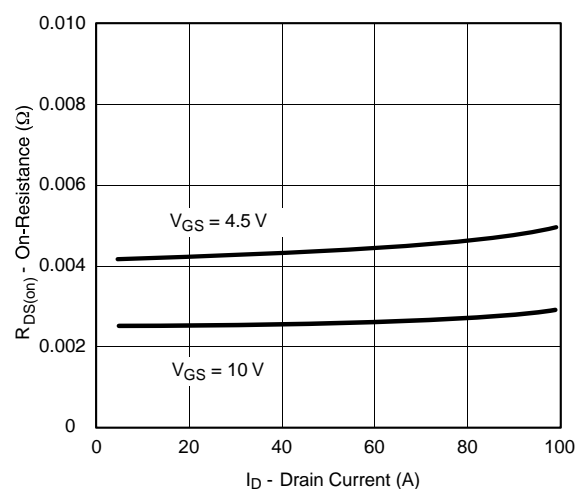
Output Characteristics



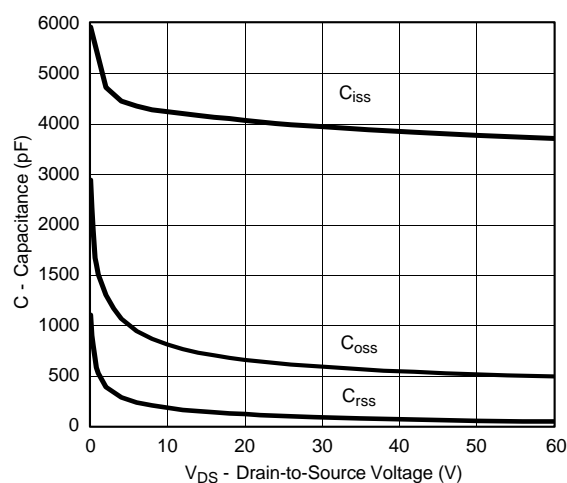
Transfer Characteristics



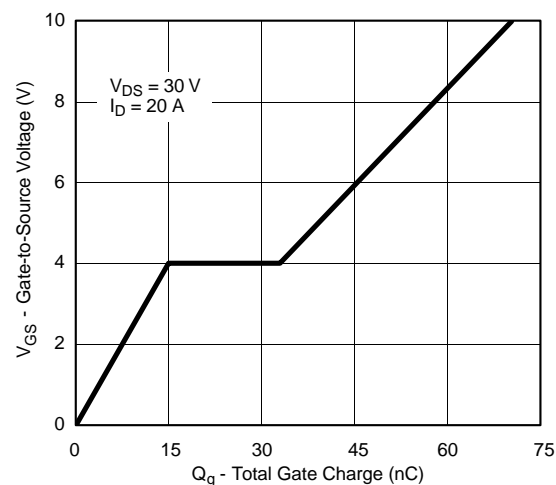
Transconductance



On-Resistance vs. Drain Current

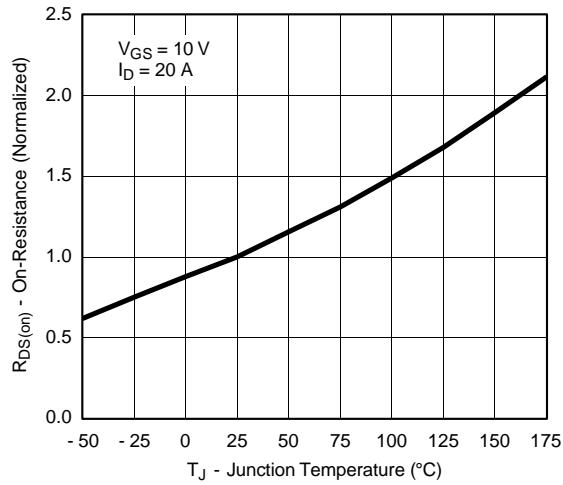


Capacitance

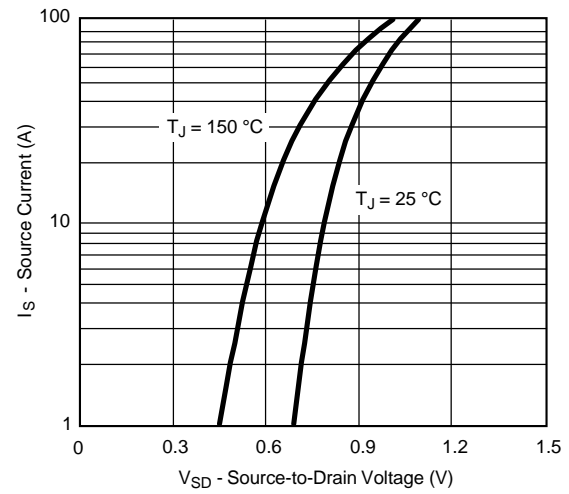


Gate Charge

TYPICAL CHARACTERISTICS (25 °C unless noted)

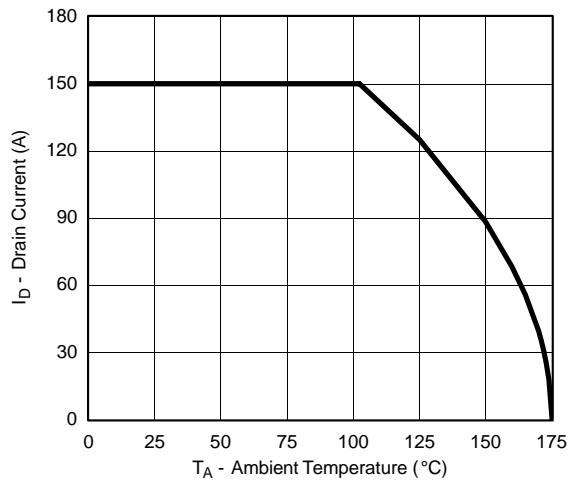


On-Resistance vs. Junction Temperature

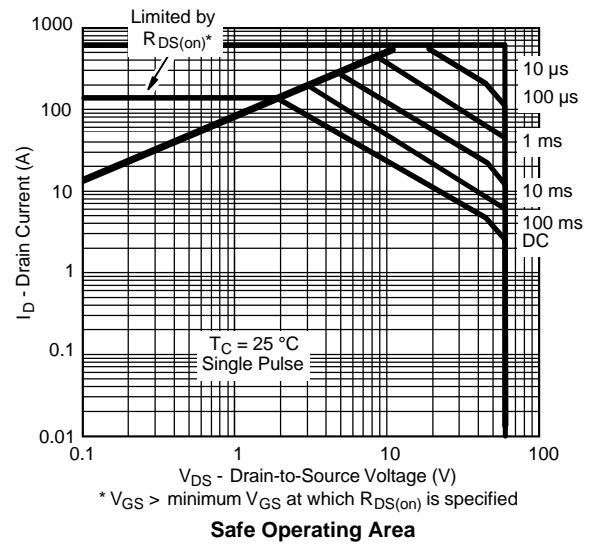


Source-Drain Diode Forward Voltage

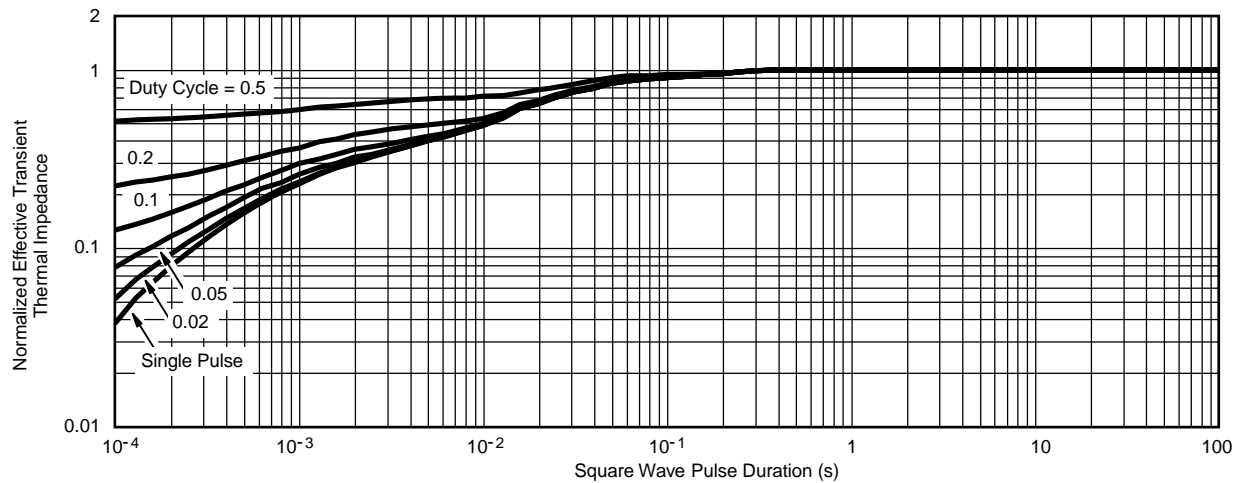
THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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