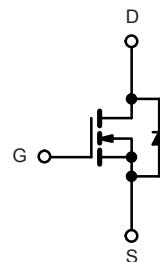


## N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY		
$V_{DS}$	60	V
$R_{DS(on)}$ $V_{GS} = 10$ V	11	$m\Omega$
$R_{DS(on)}$ $V_{GS} = 4.5$ V	12	$m\Omega$
$I_D$	75	A
Configuration	Single	

### FEATURES

- 175 °C Junction Temperature
- TrenchFET® Power MOSFET



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25$ °C, unless otherwise noted)			
Parameter	Symbol	Limit	Unit
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175$ °C) <sup>b</sup>	$I_D$ $T_C = 25$ °C	75	A
	$I_D$ $T_C = 100$ °C	50 <sup>a</sup>	
Pulsed Drain Current	$I_{DM}$	200	A
Continuous Source Current (Diode Conduction)	$I_S$	50 <sup>a</sup>	
Avalanche Current	$I_{AS}$	50	
Single Avalanche Energy (Duty Cycle $\leq 1$ %)	$E_{AS}$	125	mJ
Maximum Power Dissipation	$P_D$ $T_C = 25$ °C	136	W
	$P_D$ $T_A = 25$ °C	3 <sup>b</sup> , 8.3 <sup>b, c</sup>	
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 <sup>a</sup>	$t \leq 10$ sec	15	18	°C/W	
	Steady State	40	50		
Maximum Junction-to-Case	$R_{thJC}$	0.85	1.1		

Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- c.  $t \leq 10$  s.

<b>SPECIFICATIONS</b> ( $T_J = 25^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ. <sup>a</sup>	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$	1		3	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}$ , $V_{GS} = \pm 20 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60 \text{ V}$ , $V_{GS} = 0 \text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 60 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$			50	
		$V_{DS} = 60 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 175^\circ\text{C}$			250	
On-State Drain Current <sup>b</sup>	$I_{D(\text{on})}$	$V_{DS} = 5 \text{ V}$ , $V_{GS} = 10 \text{ V}$	60			A
Drain-Source On-State Resistance <sup>b</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$ , $I_D = 20 \text{ A}$		0.011		$\Omega$
		$V_{GS} = 10 \text{ V}$ , $I_D = 20 \text{ A}$ , $T_J = 125^\circ\text{C}$		0.016		
		$V_{GS} = 10 \text{ V}$ , $I_D = 20 \text{ A}$ , $T_J = 175^\circ\text{C}$		0.020		
		$V_{GS} = 4.5 \text{ V}$ , $I_D = 15 \text{ A}$		0.012		
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}$ , $I_D = 20 \text{ A}$		60		S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$		4300		pF
Output Capacitance	$C_{oss}$			470		
Reverse Transfer Capacitance	$C_{rss}$			225		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 50 \text{ A}$		47		nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			10		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			12		
Turn-On Delay Time <sup>c</sup>	$t_{d(\text{on})}$	$V_{DD} = 30 \text{ V}$ , $R_L = 0.6 \Omega$ $I_D \geq 50 \text{ A}$ , $V_{GEN} = 10 \text{ V}$ , $R_g = 2.5 \Omega$		10	20	ns
Rise Time <sup>c</sup>	$t_r$			15	25	
Turn-Off Delay Time <sup>c</sup>	$t_{d(\text{off})}$			35	50	
Fall Time <sup>c</sup>	$t_f$			20	30	
<b>Source-Drain Diode Ratings and Characteristics</b> ( $T_C = 25^\circ\text{C}$ )						
Pulsed Current	$I_{SM}$				60	A
Diode Forward Voltage	$V_{SD}$	$I_F = 20 \text{ A}$ , $V_{GS} = 0 \text{ V}$		1	1.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = 20 \text{ A}$ , $di/dt = 100 \text{ A}/\mu\text{s}$		45	100	ns

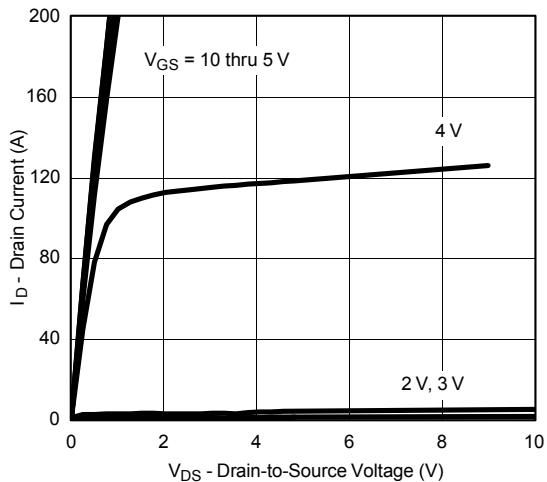
Notes:

a. For design aid only; not subject to production testing.

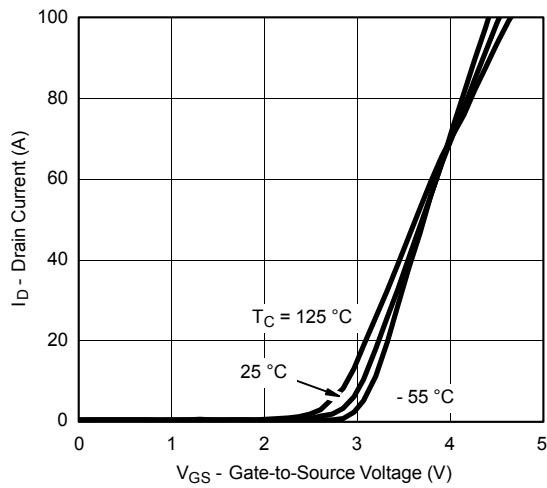
b. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

c. Independent of operating temperature.

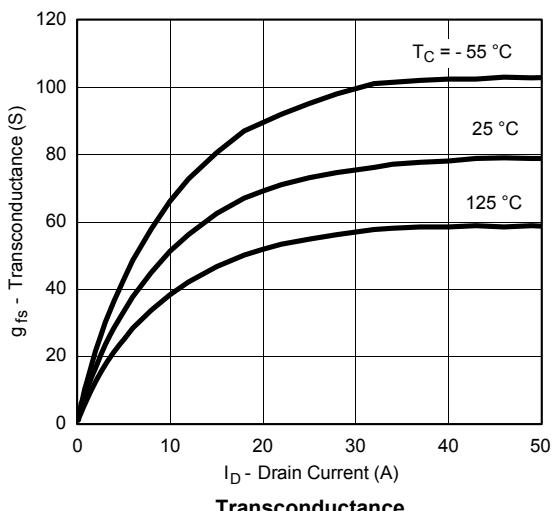
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**TYPICAL CHARACTERISTICS** (25 °C unless noted)


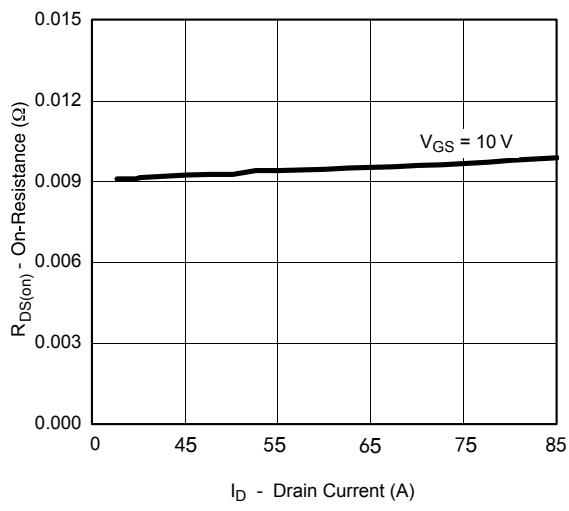
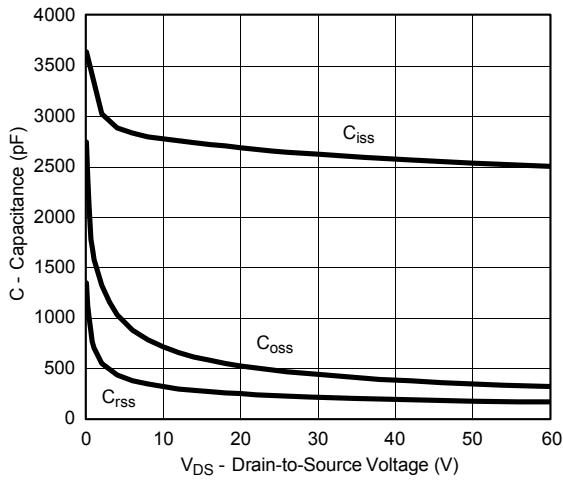
Output Characteristics



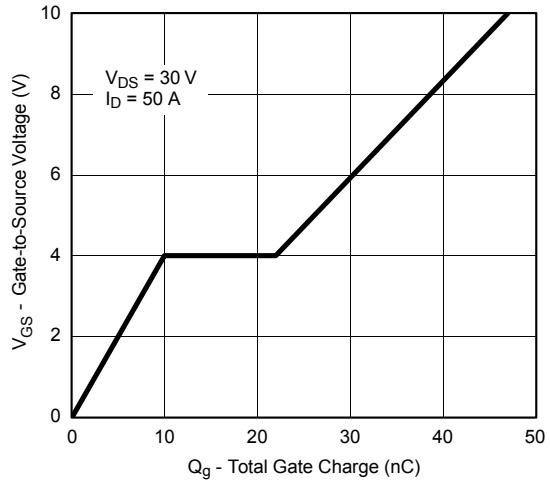
Transfer Characteristics



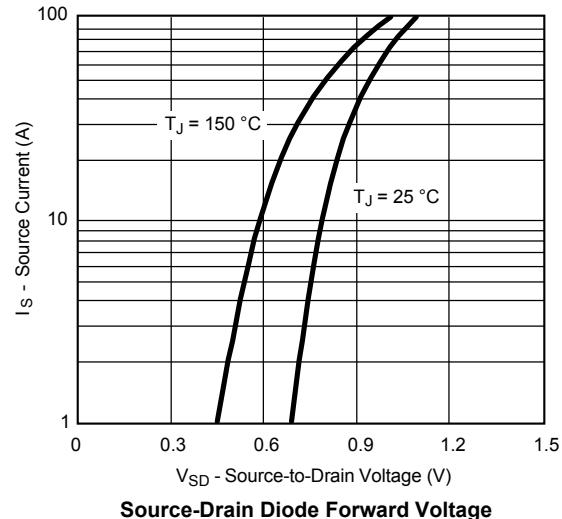
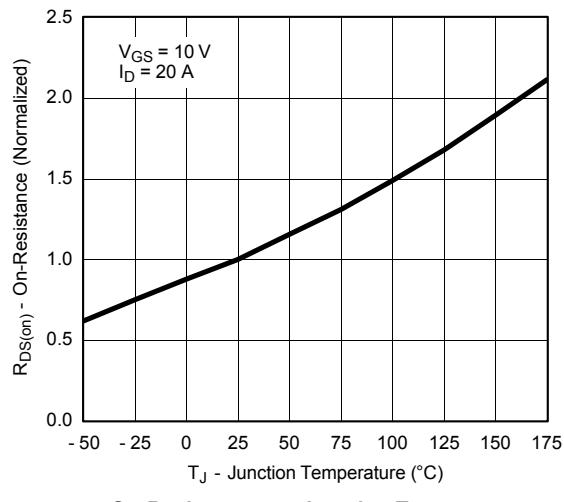
Transconductance

 $R_{DS(on)}$  vs. Drain Current

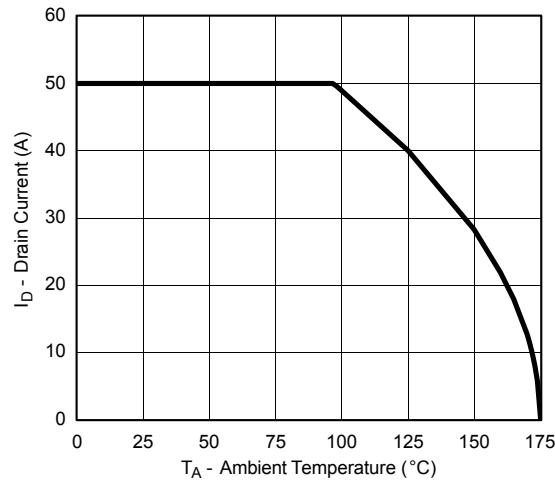
Capacitance



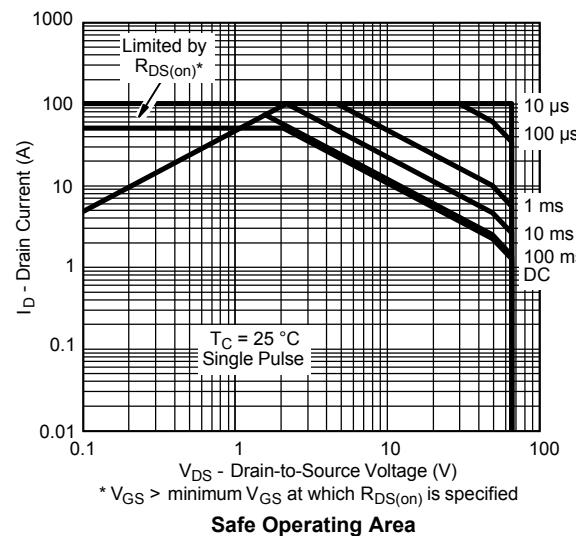
Gate Charge

**TYPICAL CHARACTERISTICS** (25 °C unless noted)

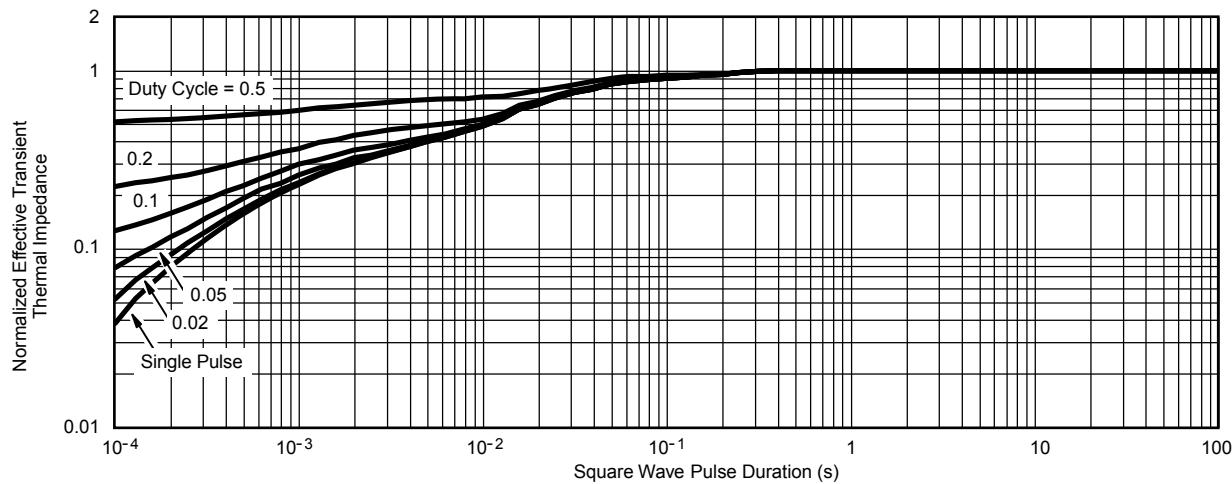
## Thermal Ratings



Maximum Drain Current vs. Ambient Temperature

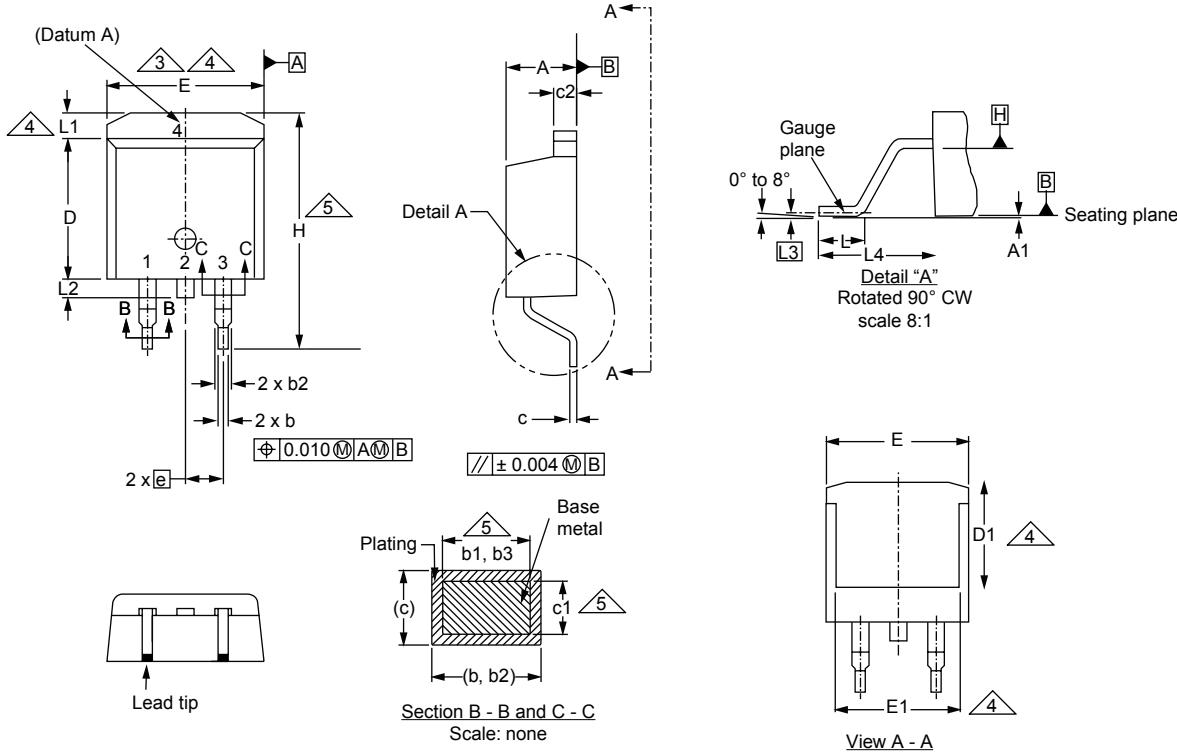


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

## **TO-263AB (HIGH VOLTAGE)**



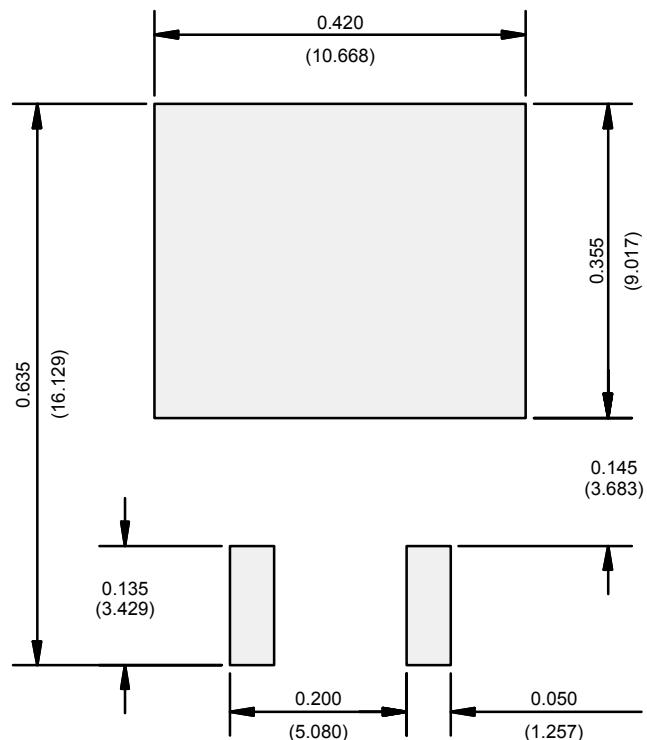
	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b1	0.51	0.89	0.020	0.035
b2	1.14	1.78	0.045	0.070
b3	1.14	1.73	0.045	0.068
c	0.38	0.74	0.015	0.029
c1	0.38	0.58	0.015	0.023
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380

	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
E	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208

## Notes

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. Dimensions are shown in millimeters (inches).
3. Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body at datum A.
4. Thermal PAD contour optional within dimension E, L1, D1 and E1.
5. Dimension b1 and c1 apply to base metal only.
6. Datum A and B to be determined at datum plane H.
7. Outline conforms to JEDEC outline to TO-263AB.

**RECOMMENDED MINIMUM PADS FOR D<sup>2</sup>PAK: 3-Lead**

Recommended Minimum Pads  
Dimensions in Inches/(mm)

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