N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) Max.	I_D (A)	Q_g (Typ.)
60	0.073 at V_{GS} = 10 V	18	19.8
	0.085 at V_{GS}= 4.5 V	15	

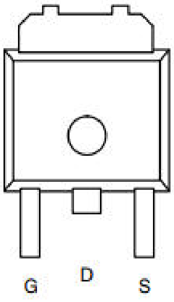
FEATURES

- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested
- Material categorization: For definitions of compliance please see

RoHS COMPLIANT

HALOGEN FREE

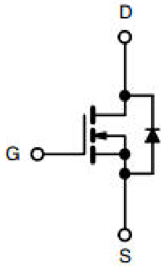
TO-252



Drain Connected to Tab

APPLICATIONS

- DC/DC Converters
- DC/AC Inverters
- Motor Drives



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 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_C = 25 °C	I_D	18	A
	T_C = 70 °C		14	
Pulsed Drain Current (t = 300 µs)		I_{DM}	25	
Avalanche Current		I_{AS}	15	
Single Avalanche Energy[a]	L = 0.1 mH	E_{AS}	11.25	mJ
Maximum Power Dissipation[a]	T_C = 25 °C	P_D	41.7[b]	W
	T_A = 25 °C[c]		2.1	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Limit**	**Unit**
Junction-to-Ambient (PCB Mount)[c]	R_{thJA}	60	°C/W
Junction-to-Case (Drain)	R_{thJC}	3	

Notes:
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When mounted on 1" square PCB (FR-4 material).
d. Base on T_C = 25 °C.

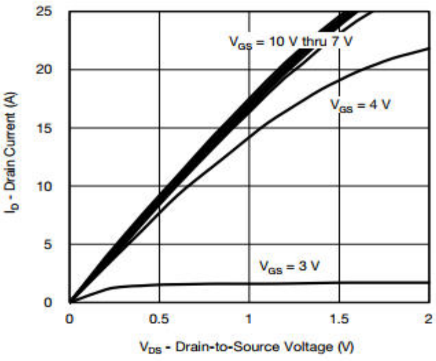
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)

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
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.0		3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 150 °C			250	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 10 V, V_{GS} = 10 V	20			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 6.6 A		0.073		Ω
		V_{GS} = 4.5 V, I_D = 6 A		0.085		
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 6.6 A		25		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz		660		pF
Output Capacitance	C_{oss}			85		
Reverse Transfer Capacitance	C_{rss}			40		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 6.6 A		19.8	30	nC
Gate-Source Charge[c]	Q_{gs}			3.6		
Gate-Drain Charge[c]	Q_{gd}			4.1		
Gate Resistance	R_g	f = 1 MHz	0.4	2	4	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 9.6 Ω $I_D \cong$ 5.2 A, V_{GEN} = 10 V, R_g = 1 Ω		8	16	ns
Rise Time[c]	t_r			11	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			18	27	
Fall Time[c]	t_f			5	10	
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 9.6 Ω $I_D \cong$ 5.2 A, V_{GEN} = 4.5 V, R_g = 1 Ω		38	57	
Rise Time[c]	t_r			58	87	
Turn-Off Delay Time[c]	$t_{d(off)}$			18	27	
Fall Time[c]	t_f			8	16	
Drain-Source Body Diode Ratings and Characteristics[b] T_C = 25 °C						
Continuous Current	I_S				18	A
Pulsed Current	I_{SM}				25	
Forward Voltage[a]	V_{SD}	I_F = 5.2 A, V_{GS} = 0 V		0.8	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 5.2 A, dI/dt = 100 A/µs		34	51	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			3	5	A
Reverse Recovery Charge	Q_{rr}			50	75	nC

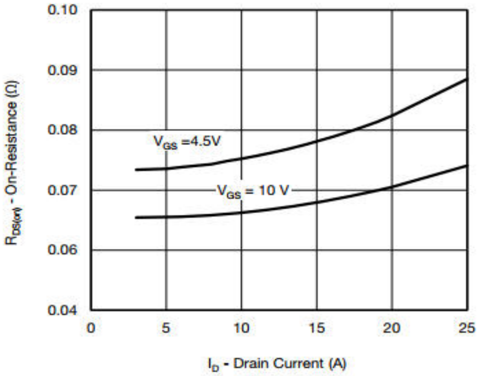
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

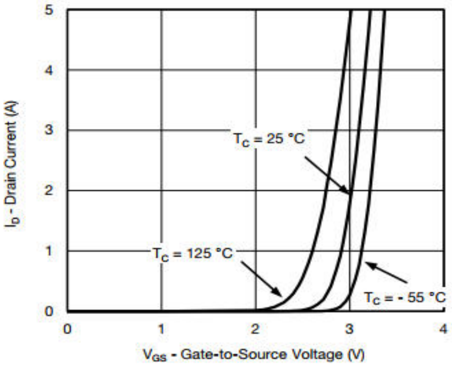
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



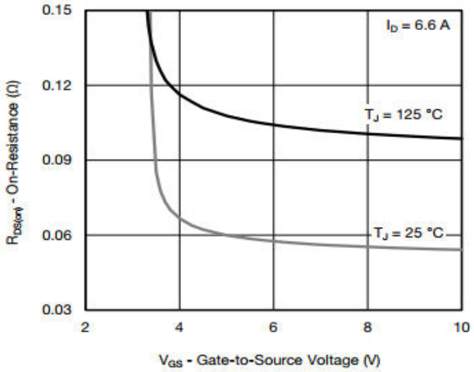
Output Characteristics



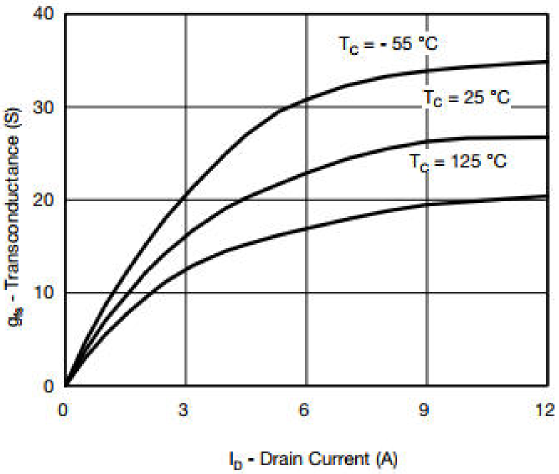
On-Resistance vs. Drain Current



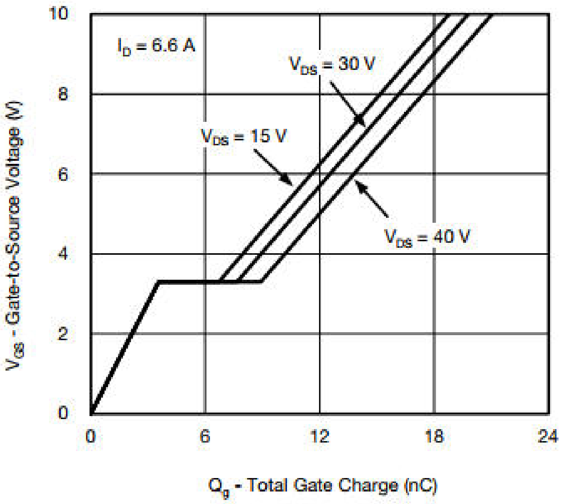
Transfer Characteristics



On-Resistance vs. Gate-to-Source Voltage

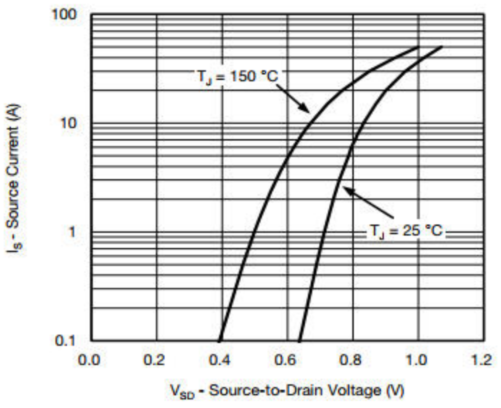


Transconductance

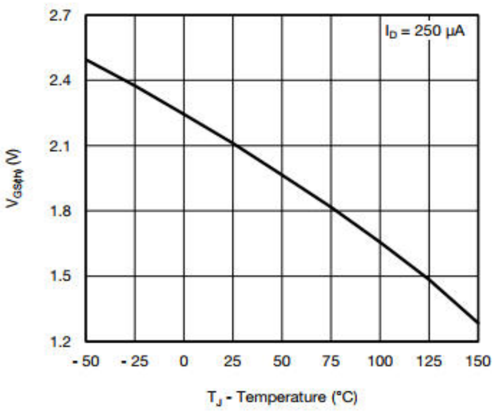


Gate Charge

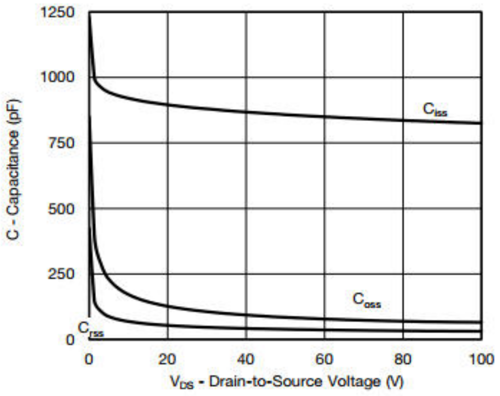
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



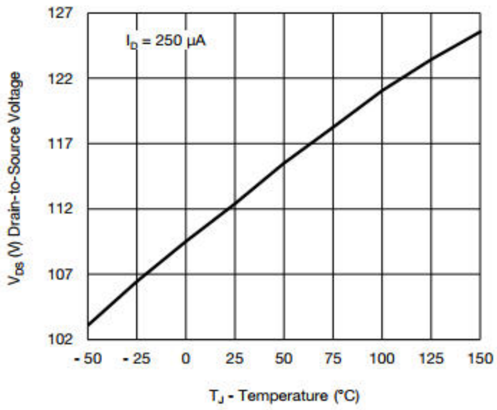
Source-Drain Diode Forward Voltage



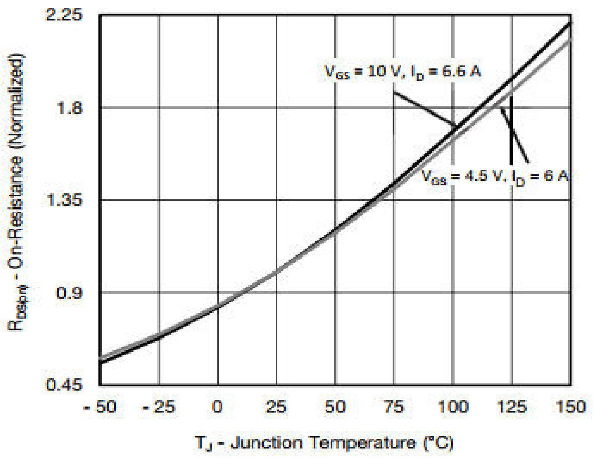
Threshold Voltage



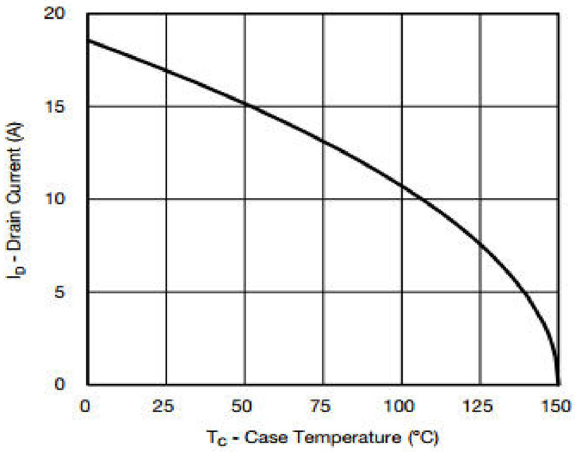
Capacitance



Drain Source Breakdown vs. Junction Temperature

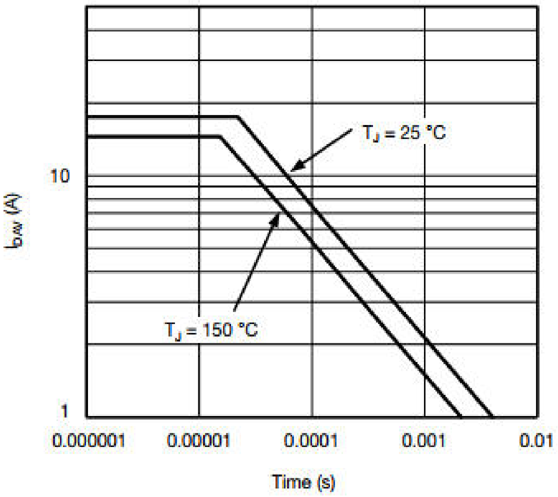


On-Resistance vs. Junction Temperature

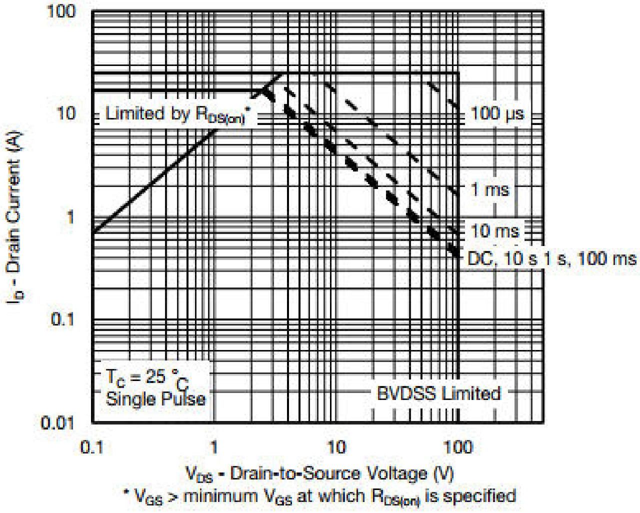


Current Derating

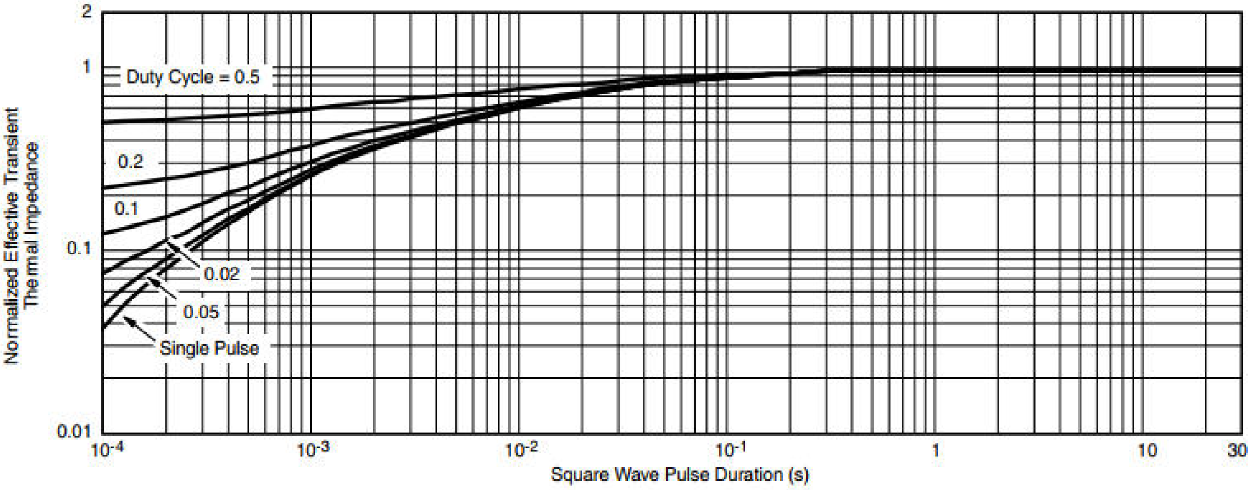
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Single Pulse Avalanche Current Capability vs. Time

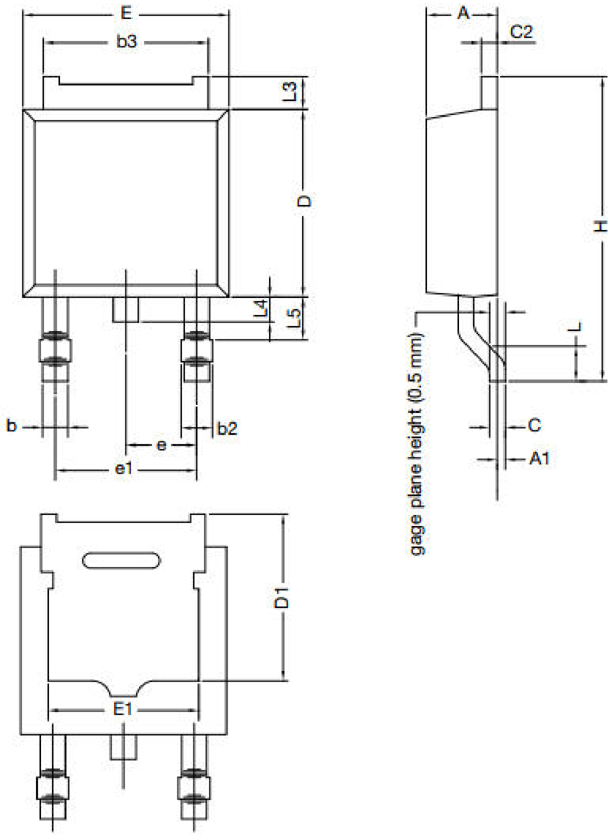


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

TO-252AA Case Outline

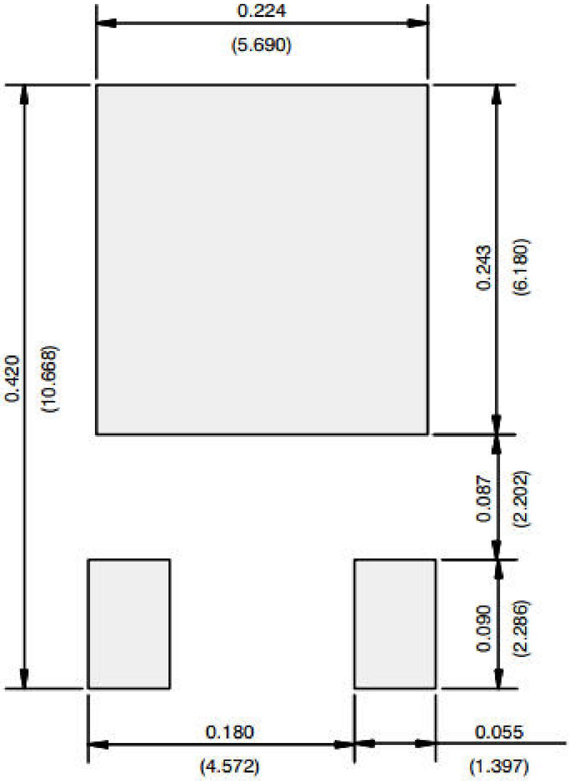


	MILLIMETERS		INCHES	
DIM.	**MIN.**	**MAX.**	**MIN.**	**MAX.**
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	4.10	-	0.161	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.01	1.52	0.040	0.060
ECN: T16-0236-Rev. P, 16-May-16 DWG: 5347				

Notes

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads
Dimensions in Inches/(mm)