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

PRODUCT SUMMARY

| V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.029 at V_{GS} = 10 V	7.0
	0.033 at V_{GS} = 4.5 V	5.6

FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET[®] Power MOSFETs
- 175 °C Maximum Junction Temperature
- Compliant to RoHS Directive 2002/95/EC

Pb-free

RoHS
COMPLIANT

HALOGEN
FREE
Available

SOT-223
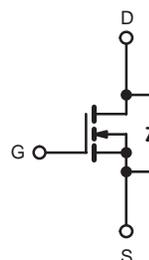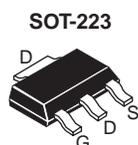
N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	60		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 175 °C)[a]	T_A = 25 °C	I_D	7.0	6.0	A
	T_A = 70 °C		6.1	5.0	
Pulsed Drain Current		I_{DM}	40		
Avalanche Current		I_{AS}	15		
Single Pulse Avalanche Energy		E_{AS}	11		mJ
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	3.3	1.7	W
	T_A = 70 °C		2.3	1.2	
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 ≤ 10 s	R_{thJA}	36	45	°C/W
	Steady State		75	90	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	17	20	

Notes:
a. 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
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	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 = 55 °C			20	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	40			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 6.0 A		0.028		Ω
		V_{GS} = 10 V, I_D = 6.0 A, T_J = 125 °C		0.032		
		V_{GS} = 10 V, I_D = 6.0 A, T_J = 175 °C		0.040		
		V_{GS} = 4.5 V, I_D = 5.1 A		0.033		
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 6.0 A		25		S
Diode Forward Voltage[a]	V_{SD}	I_S = 1.7 A, V_{GS} = 0 V		0.8	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 6.0 A		18	27	nC
Gate-Source Charge	Q_{gs}			3.4		
Gate-Drain Charge	Q_{gd}			5.3		
Gate Resistance	R_g	V_{GS} = 0.1 V, f = 5 MHz	0.5	1.4	2.4	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, R_L = 30 Ω, $I_D \cong$ 1 A, V_{GEN} = 10 V, R_g = 6 Ω		10	20	ns
Rise Time	t_r			10	20	
Turn-Off Delay Time	$t_{d(off)}$			25	50	
Fall Time	t_f			12	24	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 1.7 A, dI/dt = 100 A/μs		50	80	

Notes:
a. Pulse test; pulse width $\leq$ 300 μs, duty cycle $\leq$ 2 %.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Output Characteristics

Transfer Characteristics
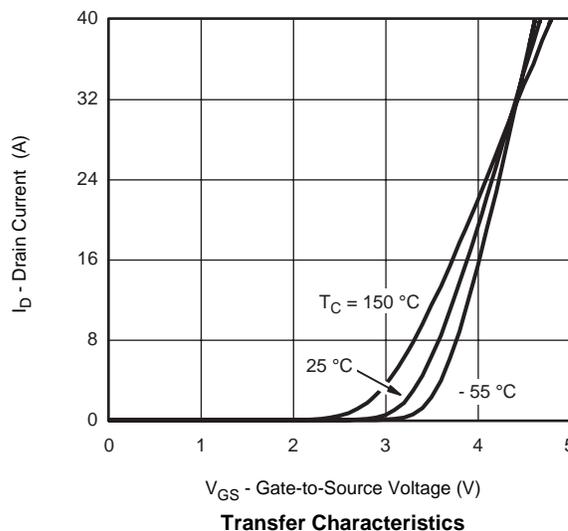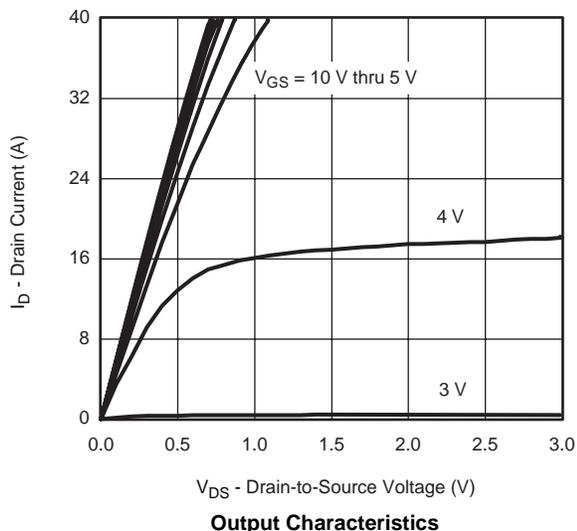
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted
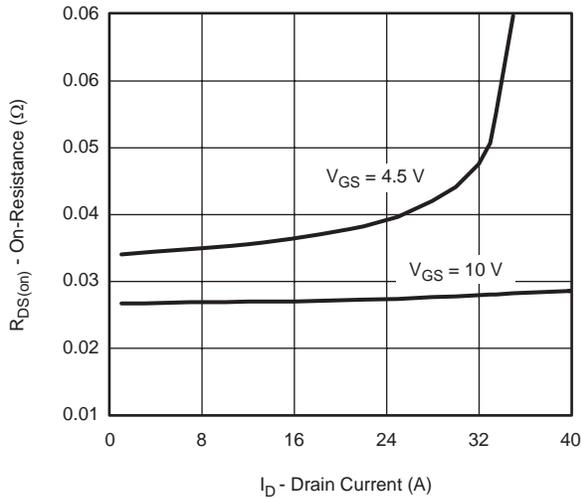
On-Resistance vs. Drain Current
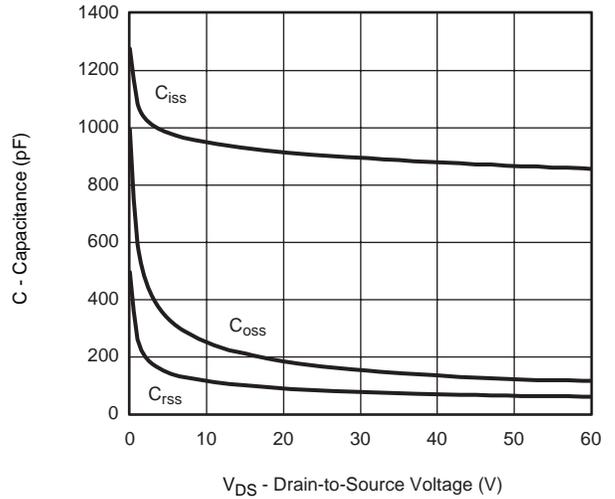
Capacitance
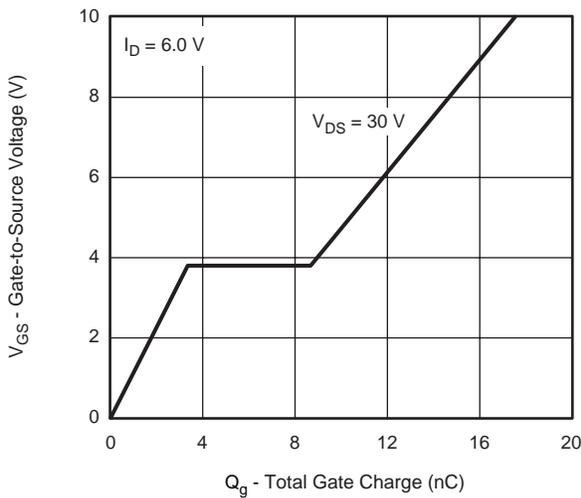
Gate Charge
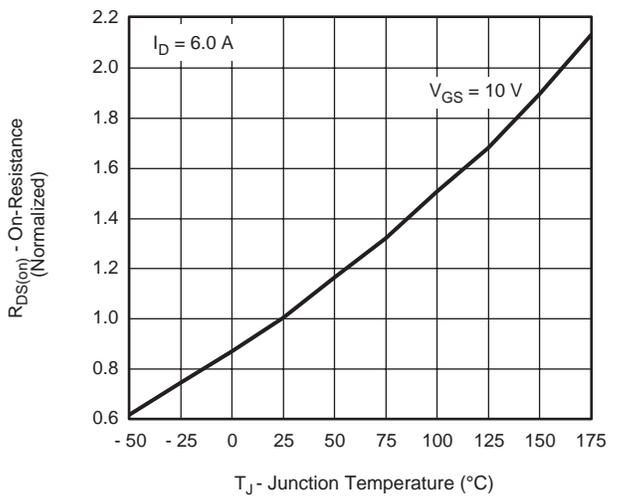
On-Resistance vs. Junction Temperature
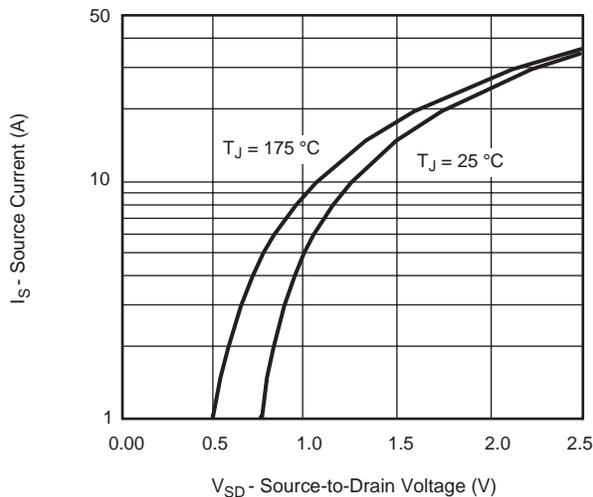
Source-Drain Diode Forward Voltage
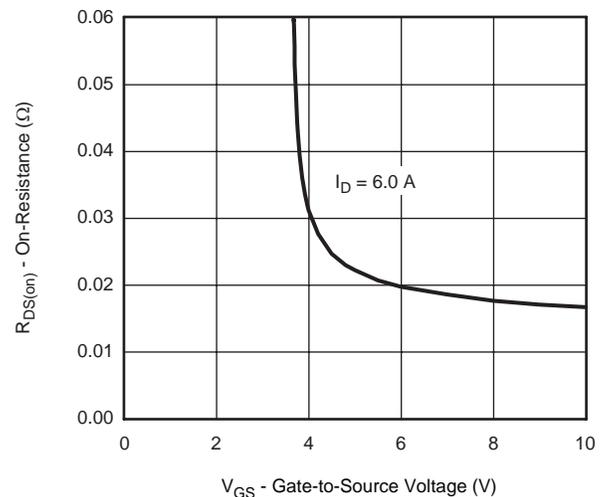
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted
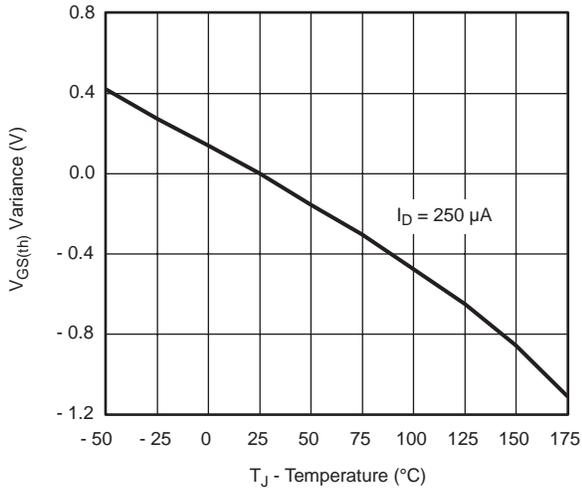
Threshold Voltage

Single Pulse Power

Notes:

1. Duty Cycle, D = $\dfrac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 75 °C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted
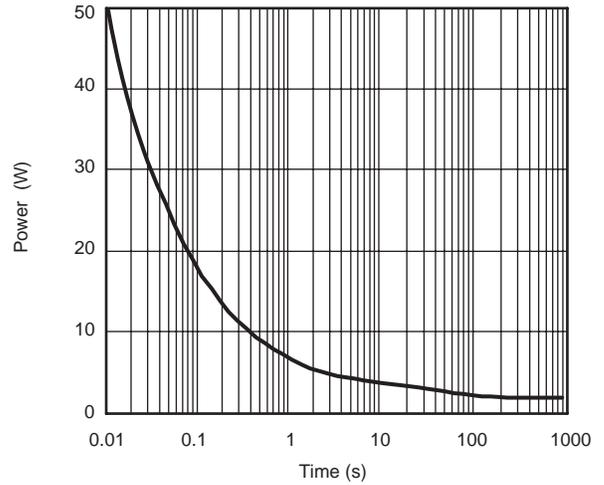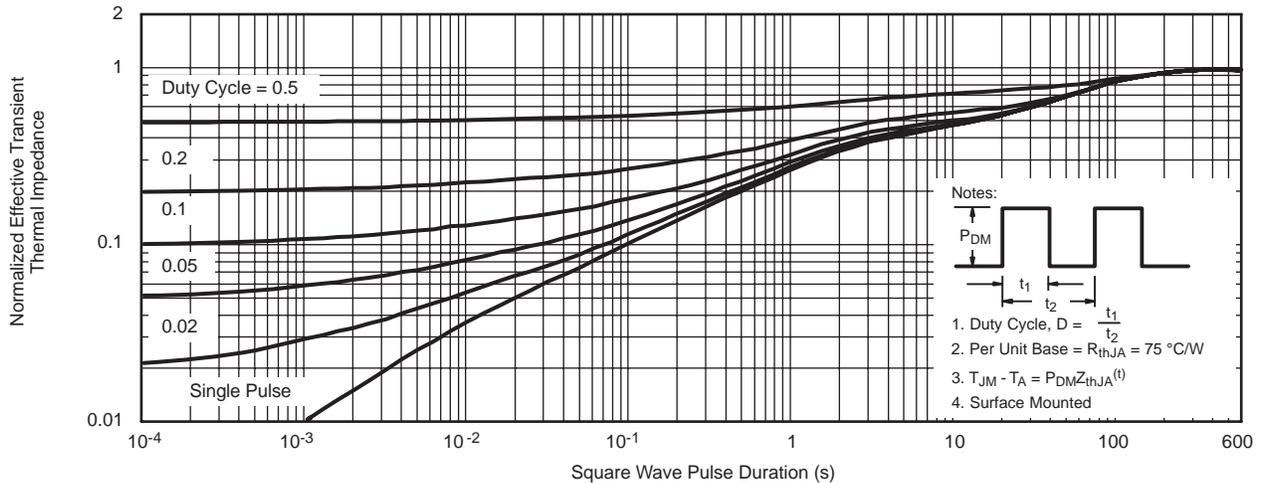
Normalized Thermal Transient Impedance, Junction-to-Ambient
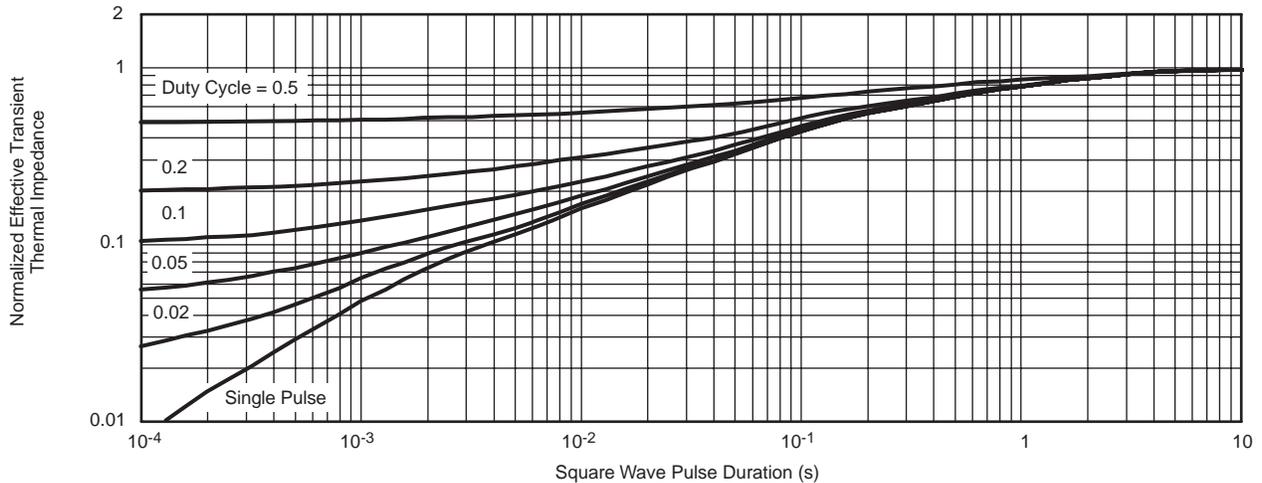
Normalized Thermal Transient Impedance, Junction-to-Foot

SOT-223 (HIGH VOLTAGE)
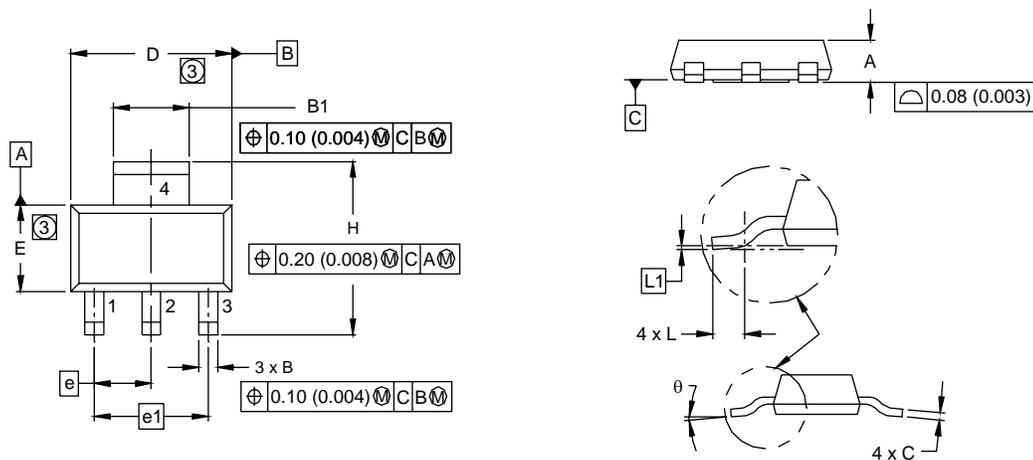
	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
A	1.55	1.80	0.061	0.071
B	0.65	0.85	0.026	0.033
B1	2.95	3.15	0.116	0.124
C	0.25	0.35	0.010	0.014
D	6.30	6.70	0.248	0.264
E	3.30	3.70	0.130	0.146
e	2.30 BSC		0.0905 BSC	
e1	4.60 BSC		0.181 BSC	
H	6.71	7.29	0.264	0.287
L	0.91	-	0.036	-
L1	0.061 BSC		0.0024 BSC	
θ	-	10'	-	10'
ECN: S-82109-Rev. A, 15-Sep-08 DWG: 5969				

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.

2. Dimensions are shown in millimeters (inches).

3. Dimension do not include mold flash.

4. Outline conforms to JEDEC outline TO-261AA.

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