Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
60V	85mΩ @ V_{GS} = 10V	4.1A
	110mΩ @ V_{GS} = 4.5V	3.6A

Features and Benefits

- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

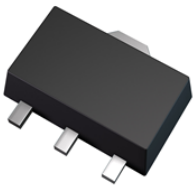
This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- DC-DC converters
- Power-management functions
- Backlighting

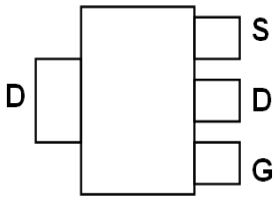
Mechanical Data

- Package: SOT89
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Finish Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.052 grams (Approximate)

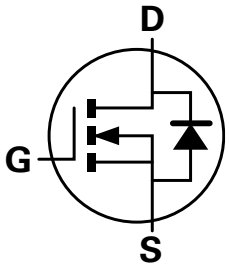
SOT89



Top View



Pin-Out Top



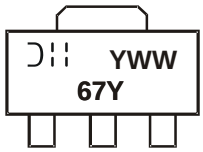
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN6070SY-13	SOT89	2,500	Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



= Manufacturer's Marking
67Y = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Year (ex: 4 = 2024)
WW = Week (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	4.1 3.3	A
Pulsed Drain Current (10µs Pulse, Duty Cycle ≦ 1%)			I_{DM}	15	A
Maximum Body Diode Continuous Current (Note 6)			I_S	2.5	A
Pulsed Body Diode Current (10µs Pulse, Duty Cycle ≦ 1%)			I_{SM}	15	A
Avalanche Current, L = 0.1mH (Note 7)			I_{AS}	11	A
Avalanche Energy, L = 0.1mH (Note 7)			E_{AS}	6	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	122	°C/W
	t < 10s		72	°C/W
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	58	°C/W
	t < 10s		34	°C/W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	12	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	I_D = 250µA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	—	3.0	V	I_D = 250µA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	70	85	mΩ	V_{GS} = 10V, I_D = 2.5A
			76	110		V_{GS} = 4.5V, I_D = 1.5A
Diode Forward Voltage	V_{SD}	—	0.75	1.2	V	I_S = 12A, V_{GS} = 0V
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	588	—	pF	V_{DS} = 30V, V_{GS} = 0V F = 1MHz
Output Capacitance	C_{oss}	—	26.5	—		
Reverse Transfer Capacitance	C_{rss}	—	20	—		
Gate Resistance	R_g	—	1.5	—	Ω	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz,
Total Gate Charge (V_{GS}= 4.5V)	Q_g	—	5.6	—	nC	V_{DS} = 30V, I_D = 3A
Total Gate Charge (V_{GS}= 10V)	Q_g	—	12.3	—		
Gate-Source Charge	Q_{gs}	—	1.7	—		
Gate-Drain Charge	Q_{gd}	—	1.9	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	—	ns	V_{DD} = 30V, V_{GS} = 10V $R_L \cong 50Ω$, $R_g \cong 20Ω$
Turn-On Rise Time	t_R	—	4.1	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	35	—		
Turn-Off Fall Time	t_F	—	11	—		
Body Diode Reverse Recovery Time	t_{RR}	—	18	—	ns	I_S = 12A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	12	—	nC	I_S = 12A, di/dt = 100A/µs

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

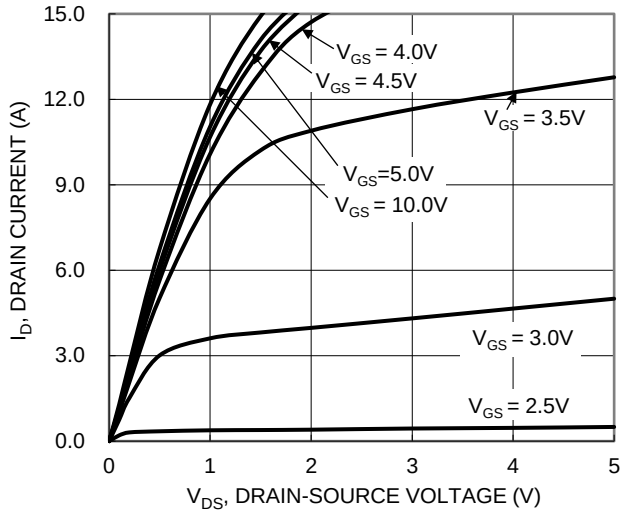


Figure 1. Typical Output Characteristic

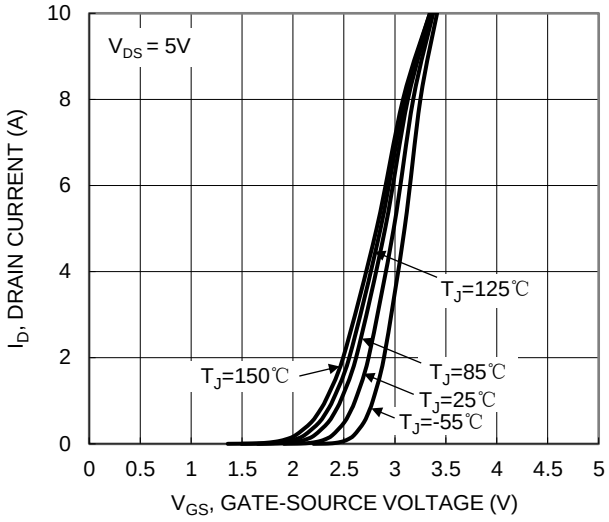


Figure 2. Typical Transfer Characteristic

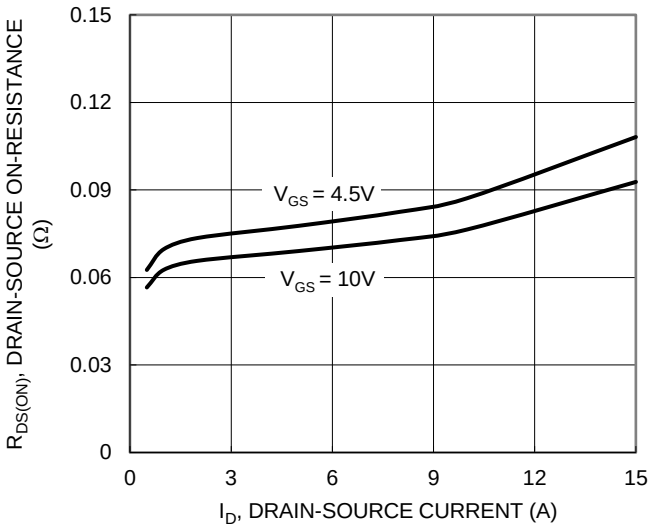


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

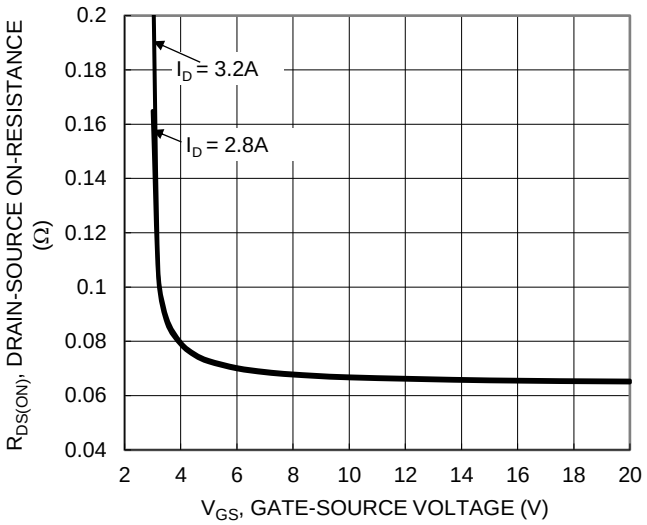


Figure 4. Typical Transfer Characteristic

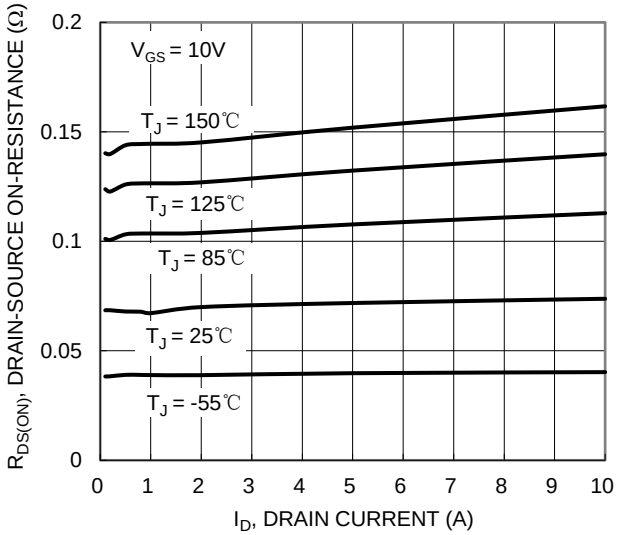


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

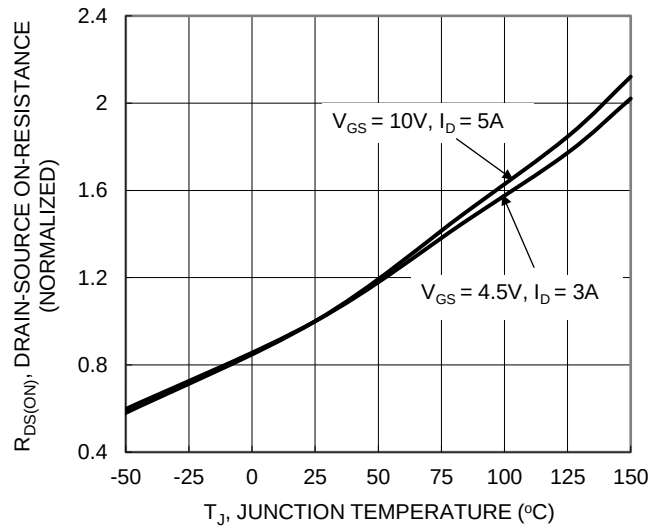


Figure 6. On-Resistance Variation with Temperature

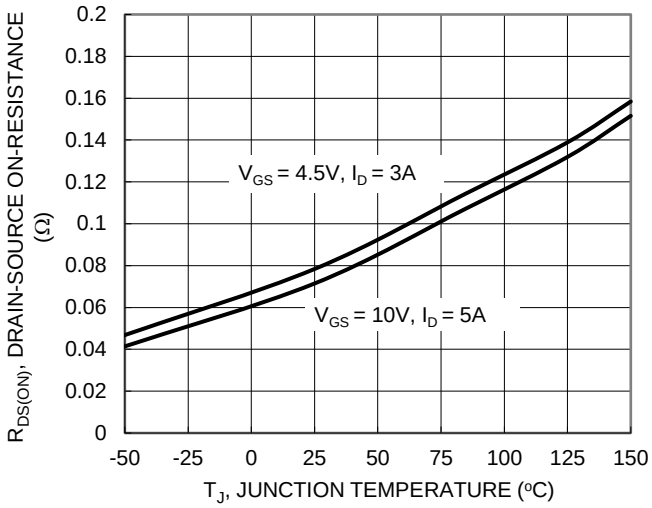


Figure 7. On-Resistance Variation with Temperature

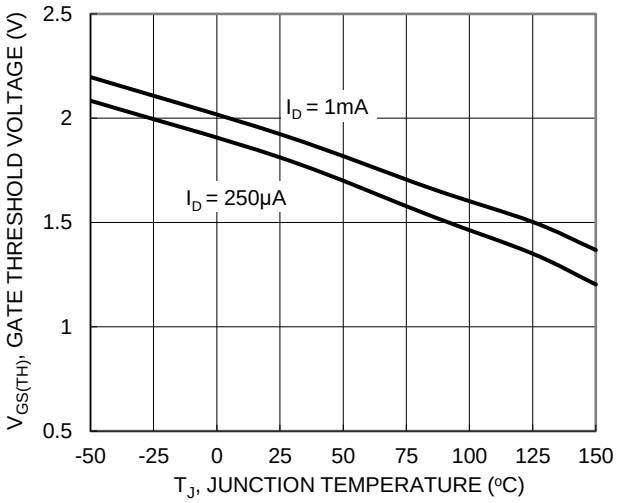


Figure 8. Gate Threshold Variation vs. Junction Temperature

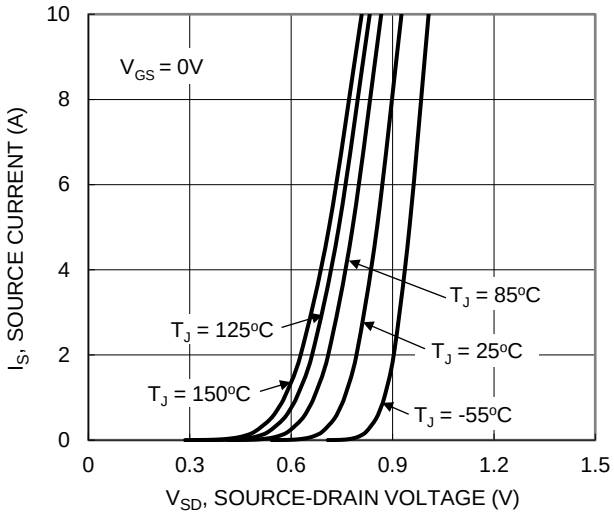


Figure 9. Diode Forward Voltage vs. Current

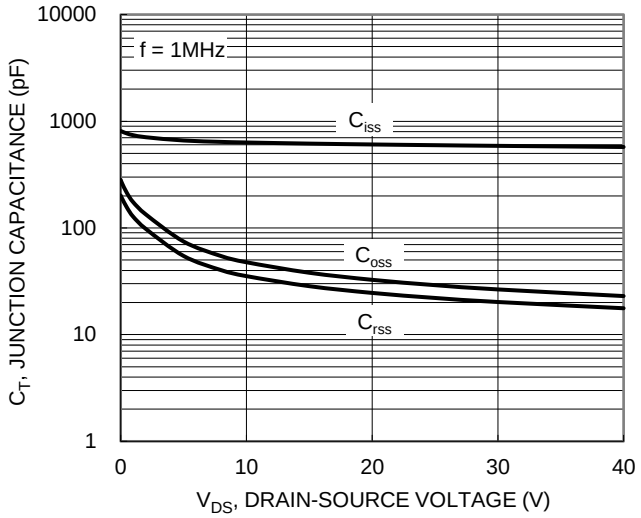


Figure 10. Typical Junction Capacitance

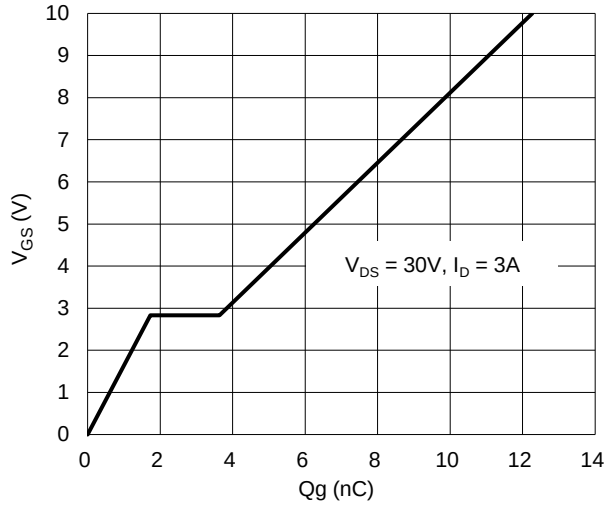


Figure 11. Gate Charge

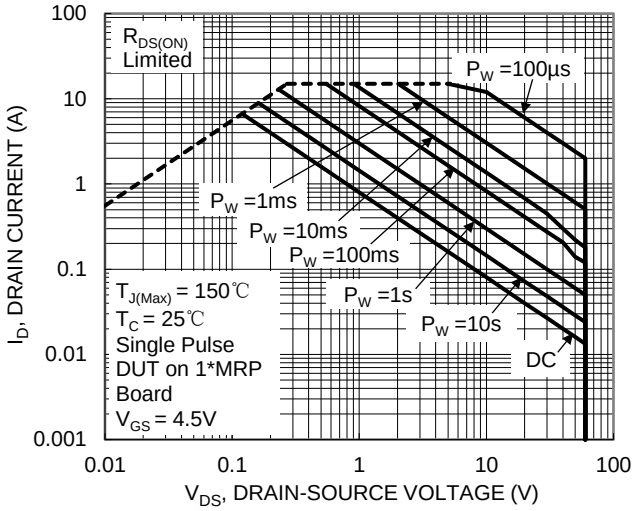


Figure 12. SOA, Safe Operation Area

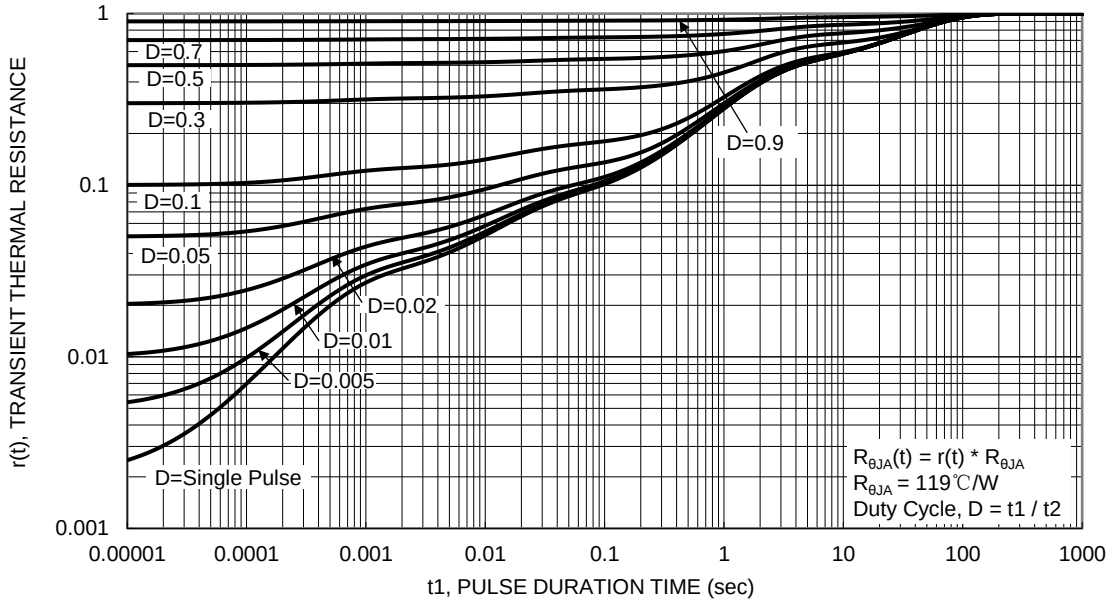
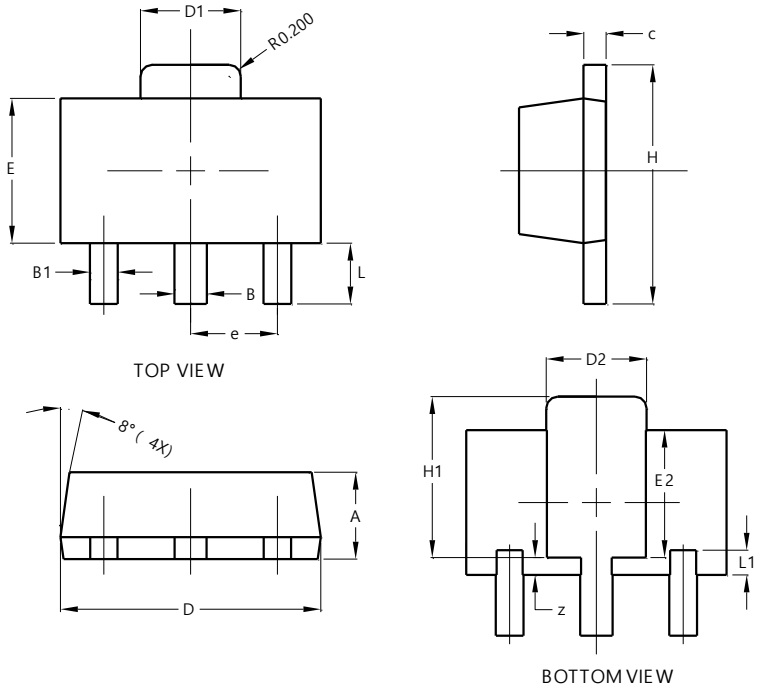


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT89

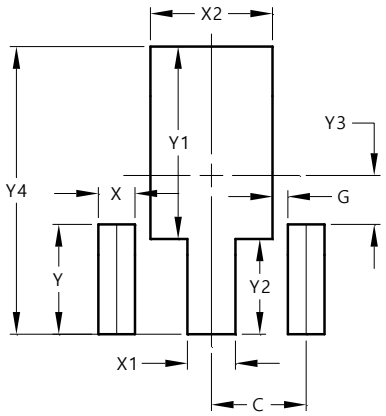


SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT89



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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