

## Dual P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>d, e</sup>	Q <sub>g</sub> (Typ.)
- 30	0.016 at V <sub>GS</sub> = - 10 V	- 9.5	15 nC
	0.020 at V <sub>GS</sub> = - 4.5 V	- 8.0	

### FEATURES

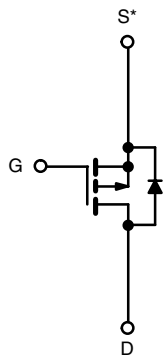
- Halogen-free
- TrenchFET<sup>®</sup> Power MOSFET
- 100 % UIS Tested

### APPLICATIONS

- Load Switches
  - Notebook PCs
  - Desktop PCs
  - Game Stations

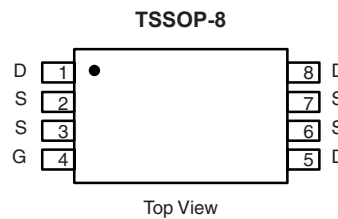


RoHS  
COMPLIANT



\* Source Pins 2, 3, 6 and 7 must be tied common.

P-Channel MOSFET



Top View

ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V <sub>DS</sub>	- 30	V
Gate-Source Voltage		V <sub>GS</sub>	± 20	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	T <sub>C</sub> = 25 °C	I <sub>D</sub>	- 9.5 <sup>e</sup>	A
	T <sub>C</sub> = 70 °C		- 8.0 <sup>e</sup>	
	T <sub>A</sub> = 25 °C		- 8.3 <sup>a, b</sup>	
	T <sub>A</sub> = 70 °C		- 7.9 <sup>a, b</sup>	
Pulsed Drain Current		I <sub>DM</sub>	- 32 <sup>e</sup>	
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C	I <sub>S</sub>	- 4.1	
	T <sub>A</sub> = 25 °C		- 2.0 <sup>a, b</sup>	
Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	- 20	mJ
Single-Pulse Avalanche Energy		E <sub>AS</sub>	20	
Maximum Power Dissipation	T <sub>C</sub> = 25 °C	P <sub>D</sub>	5.0	W
	T <sub>C</sub> = 70 °C		3.2	
	T <sub>A</sub> = 25 °C		2.5 <sup>a, b</sup>	
	T <sub>A</sub> = 70 °C		1.6 <sup>a, b</sup>	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a, c</sup>	t ≤ 10 s	R <sub>thJA</sub>	38	50	°C/W
Maximum Junction-to-Foot	Steady State	R <sub>thJF</sub>	20	25	

Notes:

- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under Steady State conditions is 85 °C/W.
- Based on T<sub>C</sub> = 25 °C.
- Limited by package.

<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 30			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 31		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		4.5			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1.0		- 3.0	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq -10\text{ V}, V_{GS} = -10\text{ V}$	- 30			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -7.3\text{ A}$		0.016		$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -6.2\text{ A}$		0.020		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}, I_D = -9.1\text{ A}$		23		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1350		pF
Output Capacitance	$C_{oss}$		215			
Reverse Transfer Capacitance	$C_{rss}$		185			
Total Gate Charge	$Q_g$	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -9.1\text{ A}$		32	50	nC
				15	25	
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -15\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -9.1\text{ A}$		4		
Gate-Drain Charge	$Q_{gd}$			7.5		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		5.8		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		10	15	ns
Rise Time	$t_r$			8	15	
Turn-Off DelayTime	$t_{d(off)}$			45	70	
Fall Time	$t_f$			12	25	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		42	70	
Rise Time	$t_r$			35	60	
Turn-Off DelayTime	$t_{d(off)}$			40	70	
Fall Time	$t_f$			16	30	
<b>Drain-Source Body Diode Characteristics</b>						
Continous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			- 4.1	A
Pulse Diode Forward Current	$I_{SM}$				- 32	
Body Diode Voltage	$V_{SD}$	$I_S = -2\text{ A}, V_{GS} = 0\text{ V}$		- 0.75	- 1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -2\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		34	60	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			22	40	nC
Reverse Recovery Fall Time	$t_a$			11		ns
Reverse Recovery Rise Time	$t_b$			23		

Notes:

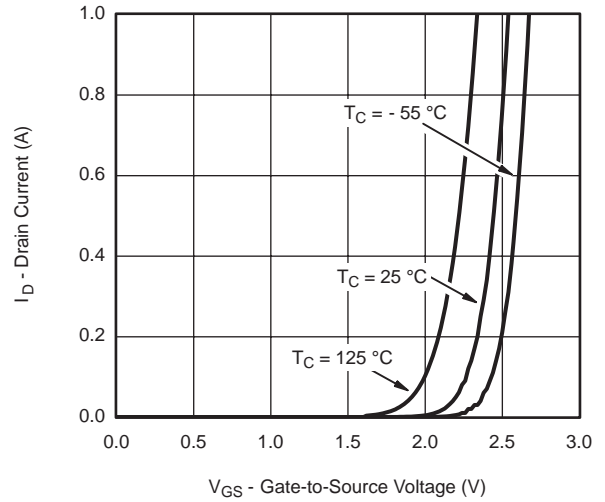
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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.

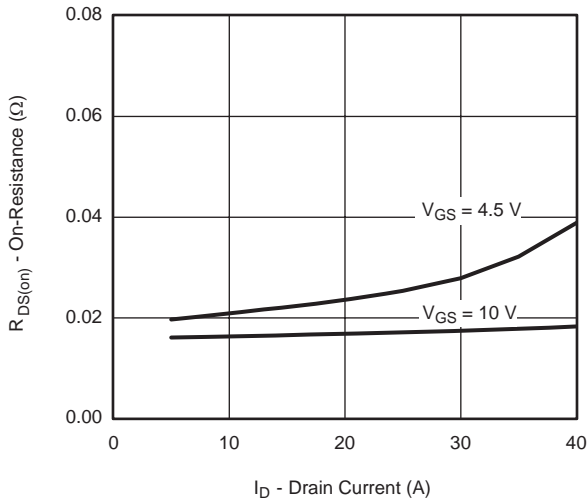
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



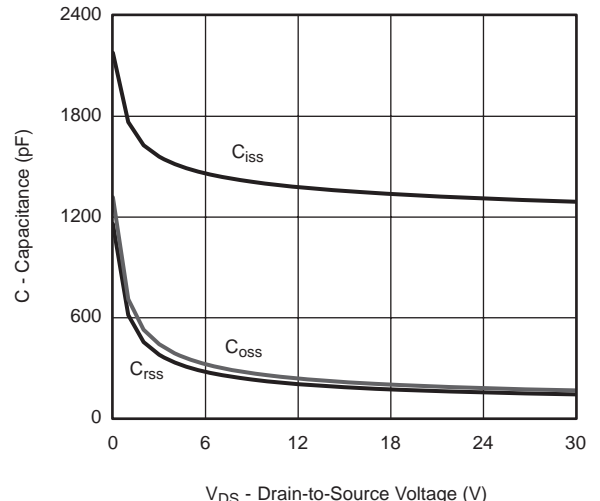
**Output Characteristics**



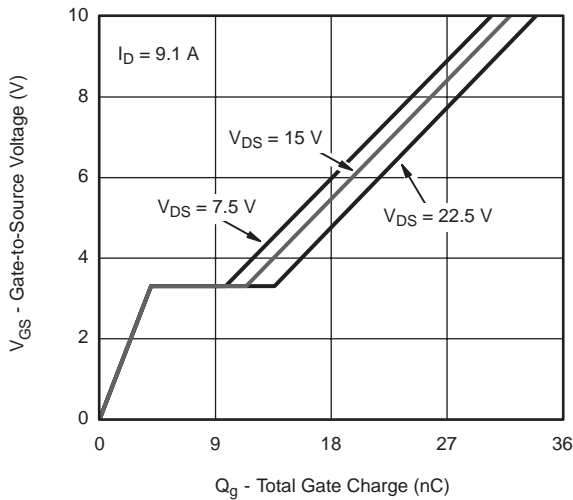
**Transfer Characteristics**



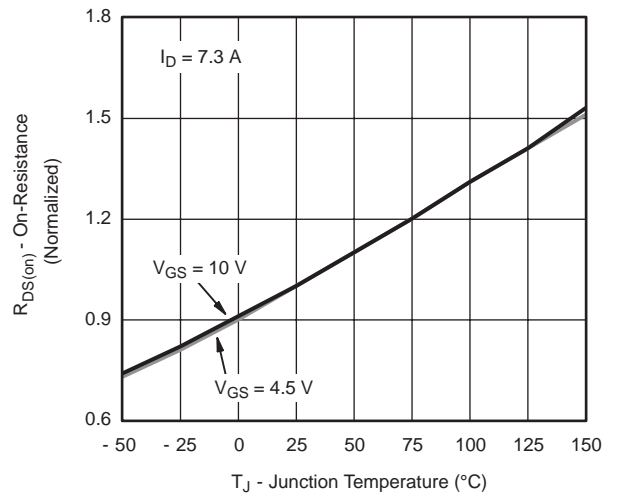
**On-Resistance vs. Drain Current**



**Capacitance**

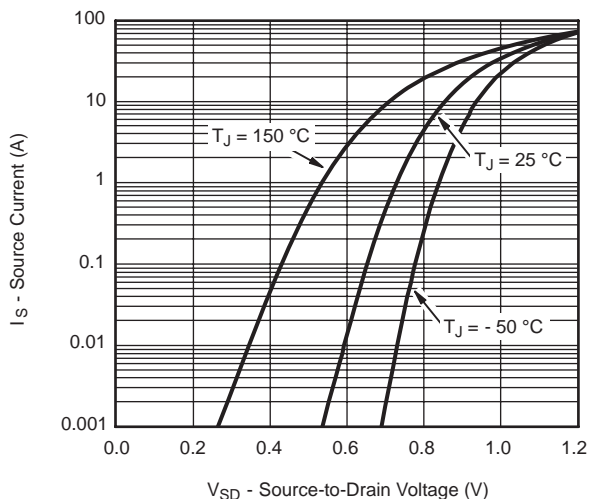


**Gate Charge**

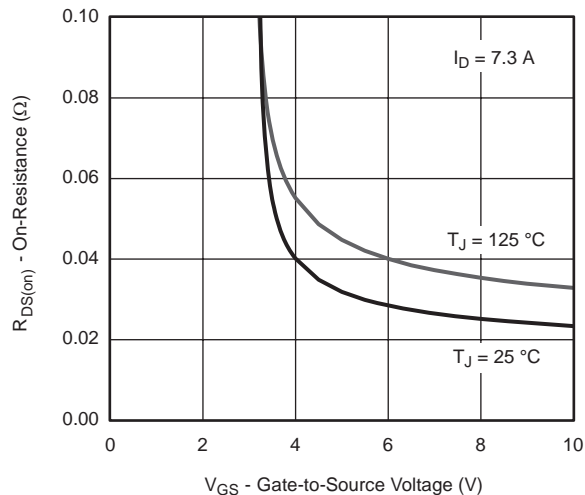


**On-Resistance vs. Junction Temperature**

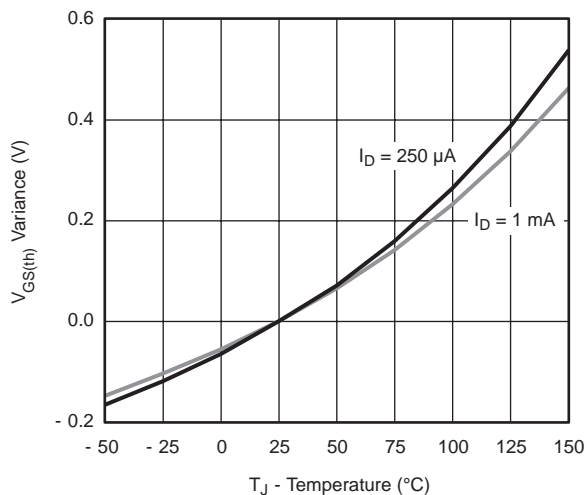
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



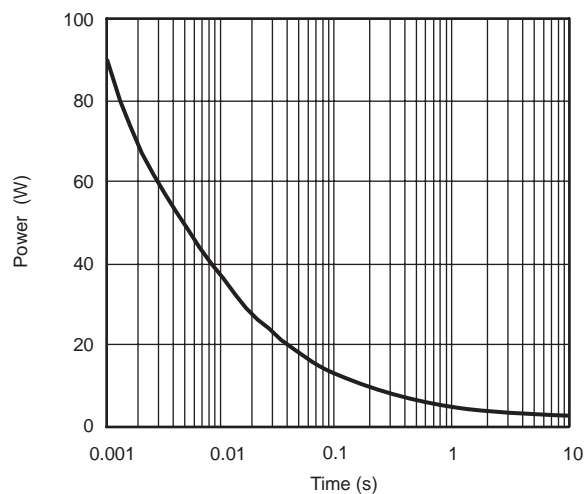
Source-Drain Diode Forward Voltage



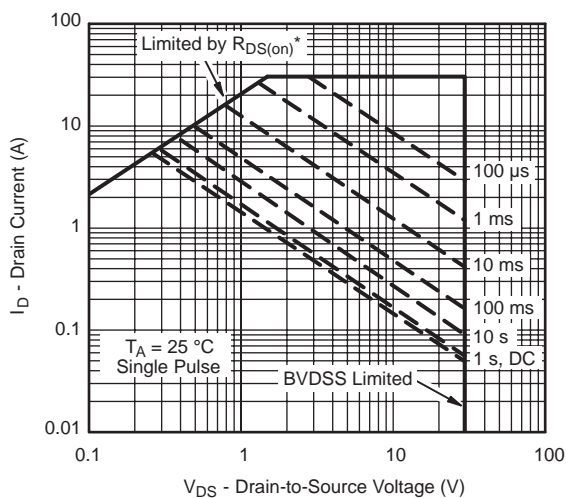
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



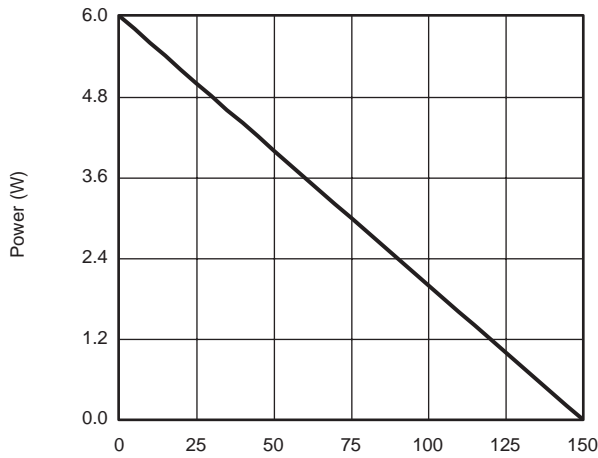
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

Safe Operating Area

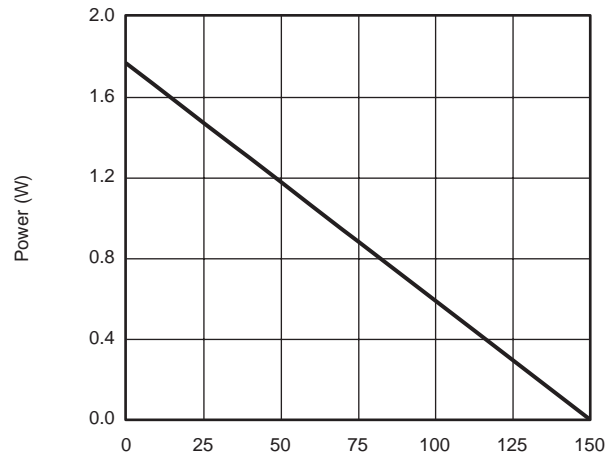
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Current Derating\***



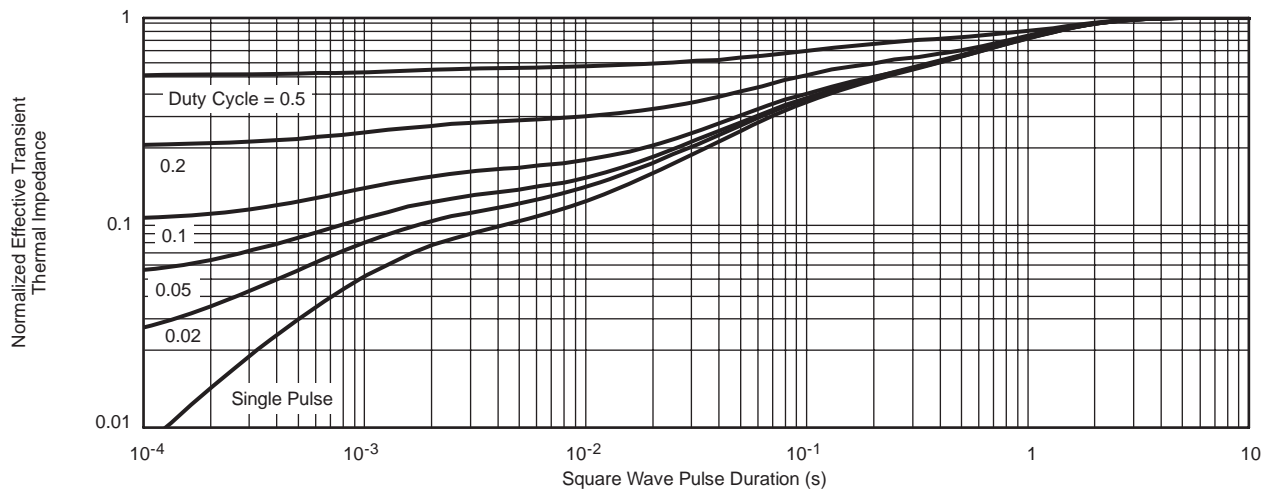
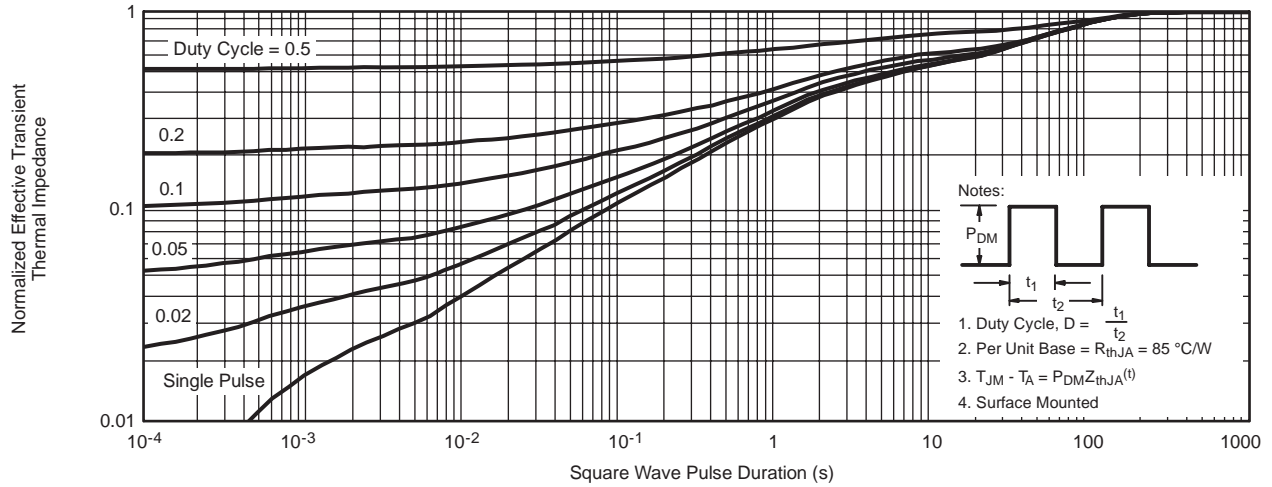
**Power, Junction-to-Foot**



**Power Derating, Junction-to-Ambient**

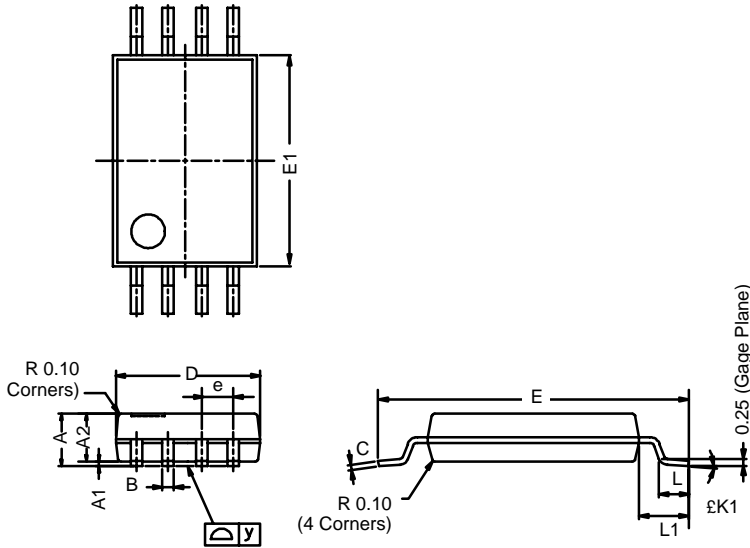
\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150\text{ °C}$ , using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**TSSOP: 8-LEAD**

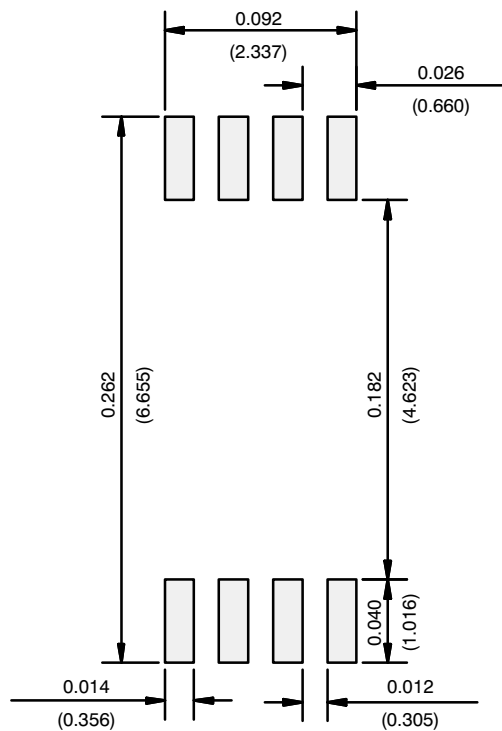
JEDEC Part Number: MO-153



Dim	MILLIMETERS		
	Min	Nom	Max
<b>A</b>	–	–	1.20
<b>A<sub>1</sub></b>	0.05	0.10	0.15
<b>A<sub>2</sub></b>	0.80	1.00	1.05
<b>B</b>	0.19	0.28	0.30
<b>C</b>	–	0.127	–
<b>D</b>	2.90	3.00	3.10
<b>E</b>	6.20	6.40	6.60
<b>E<sub>1</sub></b>	4.30	4.40	4.50
<b>e</b>	–	0.65	–
<b>L</b>	0.45	0.60	0.75
<b>L<sub>1</sub></b>	0.90	1.00	1.10
<b>Y</b>	–	–	0.10
<b>∠K1</b>	0°	3°	6°

ECN: S-03946—Rev. G, 09-Jul-01  
DWG: 5844

RECOMMENDED MINIMUM PADS FOR TSSOP-8



Recommended Minimum Pads  
Dimensions in Inches/(mm)



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