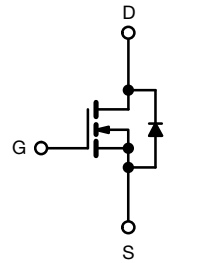
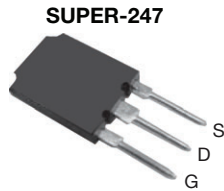


Power MOSFET



N-Channel MOSFET

FEATURES

- Low figure-of-merit $R_{on} \times Q_g$
- 100 % avalanche tested
- High peak current capability
- dv/dt ruggedness
- Improved t_{rr}/Q_{rr}
- Improved gate charge
- High power dissipations capability
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

PRODUCT SUMMARY	
V_{DS} (V) at T_J max.	560
$R_{DS(on)}$ (Ω)	$V_{GS} = 10\text{ V}$ 0.270
Q_g max. (nC)	76
Q_{gs} (nC)	21
Q_{gd} (nC)	34
Configuration	Single

ORDERING INFORMATION	
Package	Super-247
Lead (Pb)-free	SiHS20N50C-E3


ABSOLUTE MAXIMUM RATINGS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	500	V
Gate-source voltage	V_{GS}	± 30	
Continuous drain current ($T_J = 150\text{ }^\circ\text{C}$) ^a	V_{GS} at 10 V	$T_C = 25\text{ }^\circ\text{C}$	20
		$T_C = 100\text{ }^\circ\text{C}$	11
Pulsed drain current ^b	I_{DM}	80	A
Linear derating factor		1.8	$W/^\circ\text{C}$
Single pulse avalanche energy ^c	E_{AS}	361	mJ
Maximum power dissipation	P_D	250	W
Reverse diode dv/dt ^d	dv/dt	5	V/ns
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
Soldering recommendations (peak temperature) ^d	For 10 s	300	

Notes

- Limited by maximum junction temperature
- Repetitive rating; pulse width limited by maximum junction temperature
- $V_{DD} = 50\text{ V}$, starting $T_J = 25\text{ }^\circ\text{C}$, $L = 2.5\text{ mH}$, $R_g = 25\text{ }\Omega$, $I_{AS} = 17\text{ A}$
- $I_{SD} \leq 18\text{ A}$, $di/dt \leq 380\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DS}$, $T_J \leq 150\text{ }^\circ\text{C}$
- 1.6 mm from case

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum junction-to-ambient	R_{thJA}	-	40	$^\circ\text{C}/\text{W}$
Maximum junction-to-case (drain)	R_{thJC}	-	0.5	



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	500	-	-	V
V _{DS} temperature coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA	-	0.7	-	V/°C
Gate-source threshold voltage (N)	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	3.0	-	5.0	V
Gate-source leakage	I _{GSS}	V _{GS} = ± 30 V	-	-	± 100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 500 V, V _{GS} = 0 V	-	-	25	μA
		V _{DS} = 400 V, V _{GS} = 0 V, T _J = 125 °C	-	-	250	
Drain-source on-state resistance	R _{DS(on)}	V _{GS} = 10 V I _D = 10 A	-	0.225	0.270	Ω
Forward transconductance	g _{fs}	V _{DS} = 50 V, I _D = 10 A	-	6.4	-	S
Dynamic						
Input capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz	-	2451	2942	pF
Output capacitance	C _{oss}		-	300	360	
Reverse transfer capacitance	C _{rss}		-	26	32	
Total gate charge	Q _g	V _{GS} = 10 V I _D = 18 A, V _{DS} = 400 V	-	65	76	nC
Gate-source charge	Q _{gs}		-	21	-	
Gate-drain charge	Q _{gd}		-	29	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 250 V, I _D = 18 A, R _g = 9.1 Ω	-	80	-	ns
Rise time	t _r		-	27	-	
Turn-off delay time	t _{d(off)}		-	32	-	
Fall time	t _f		-	44	-	
Gate input resistance	R _g	f = 1 MHz, open drain	-	1.1	-	Ω
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I _S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	20	A
Pulsed diode forward current	I _{SM}		-	-	80	
Diode forward voltage	V _{SD}	T _J = 25 °C, I _S = 18 A, V _{GS} = 0 V	-	-	1.5	V
Reverse recovery time	t _{rr}	T _J = 25 °C, I _F = I _S , di/dt = 100 A/μs, V _R = 35 V	-	503	-	ns
Reverse recovery charge	Q _{rr}		-	6.7	-	μC
Reverse recovery current	I _{RRM}		-	30	-	A



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

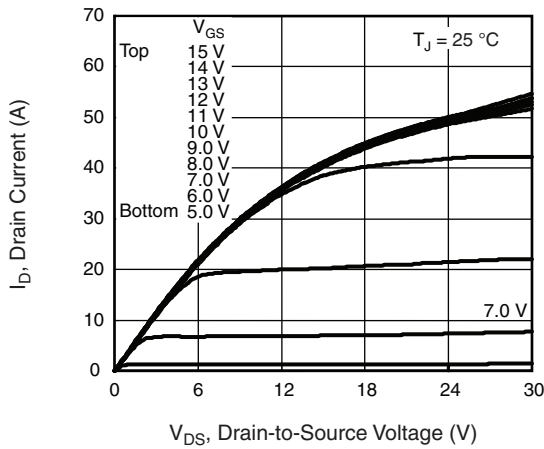


Fig. 1 - Typical Output Characteristics, $T_C = 25\text{ }^\circ\text{C}$

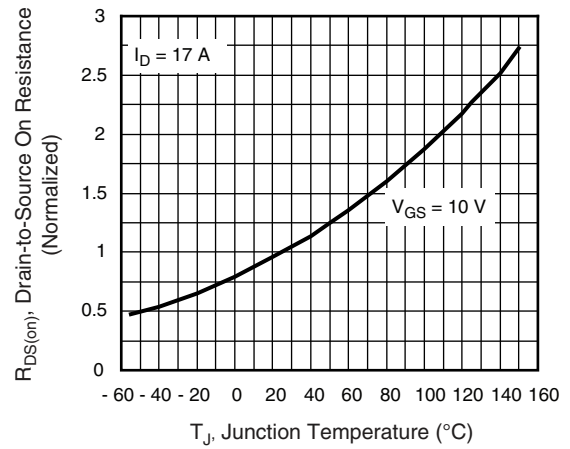


Fig. 4 - Normalized On-Resistance vs. Temperature

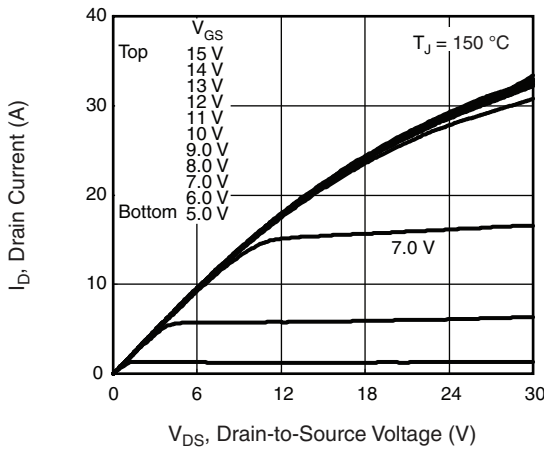


Fig. 2 - Typical Output Characteristics, $T_C = 150\text{ }^\circ\text{C}$

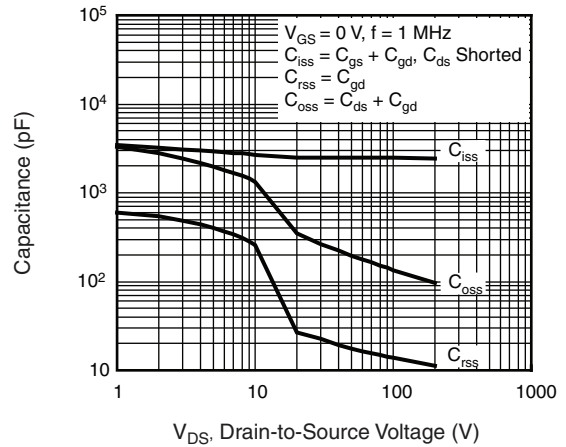


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

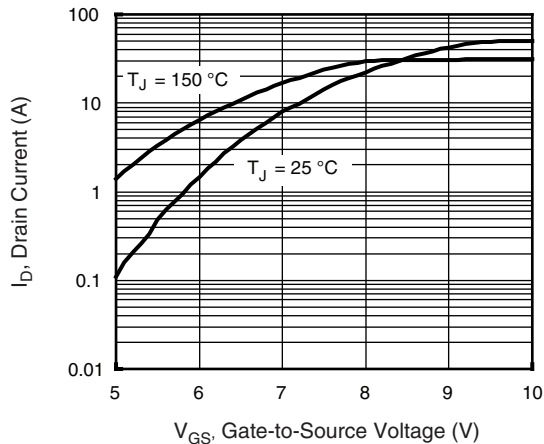


Fig. 3 - Typical Transfer Characteristics

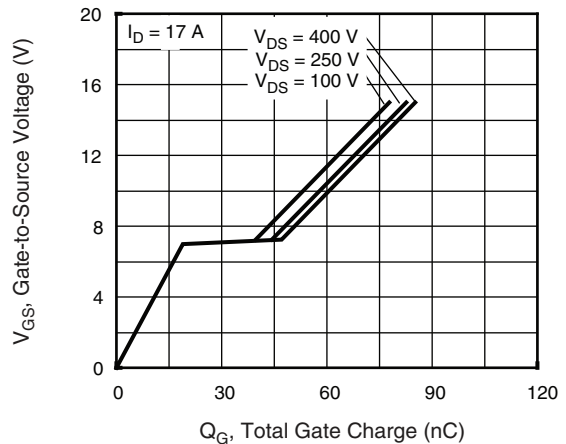


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

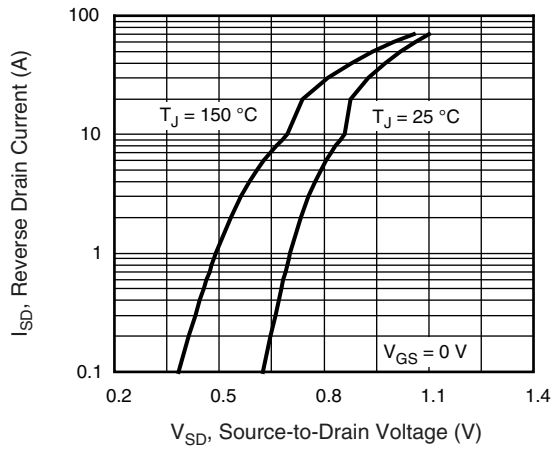


Fig. 7 - Typical Source-Drain Diode Forward Voltage

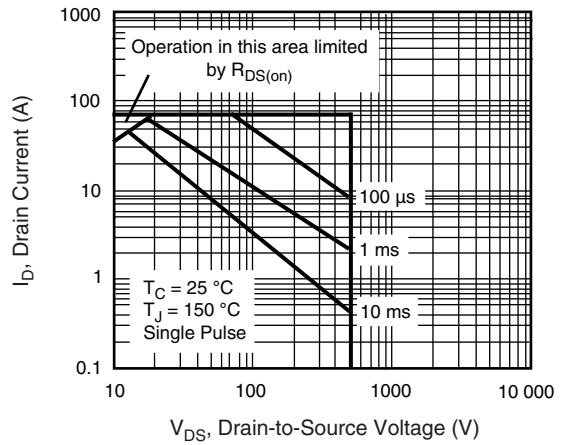


Fig. 8 - Maximum Safe Operating Area

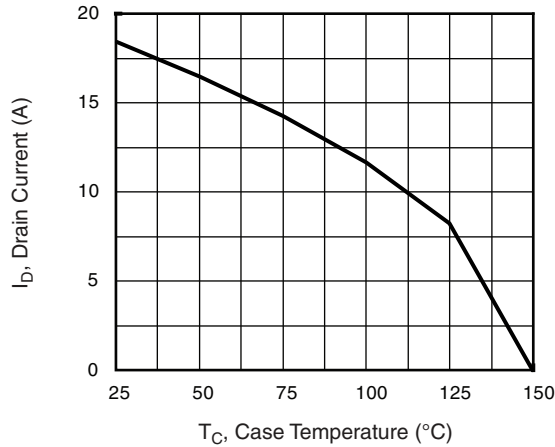


Fig. 9 - Maximum Drain Current vs. Case Temperature

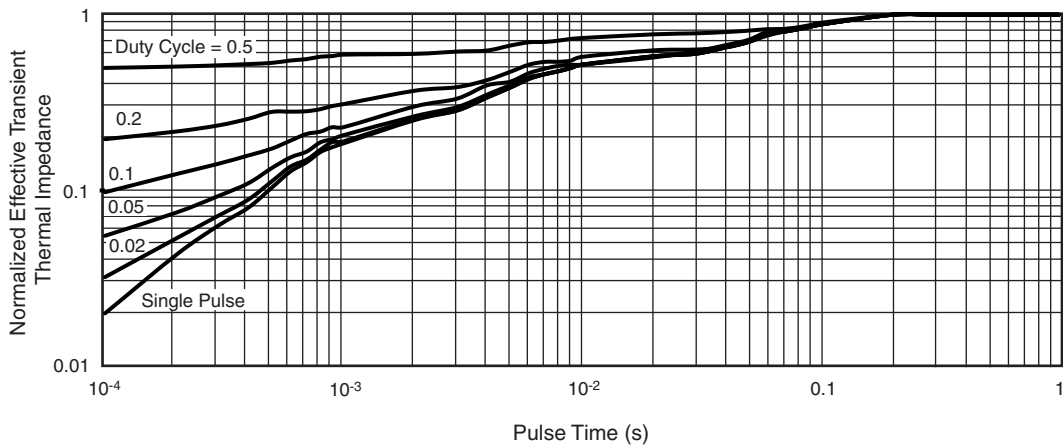


Fig. 10 - Normalized Thermal Transient Impedance, Junction-to-Case (Super-247)

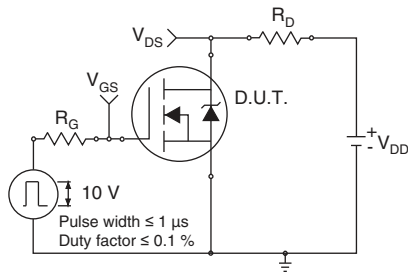


Fig. 11 - Switching Time Test Circuit

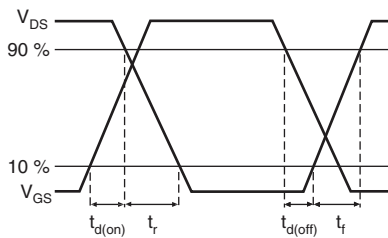


Fig. 12 - Switching Time Waveforms

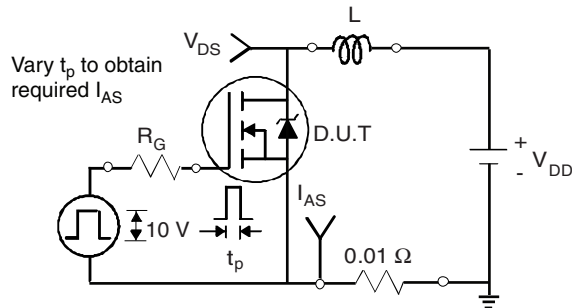


Fig. 13 - Unclamped Inductive Test Circuit

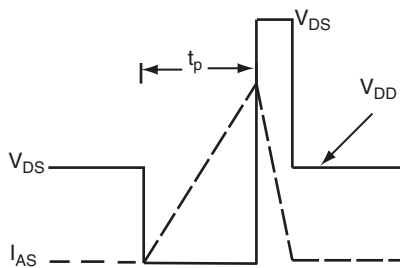


Fig. 14 - Unclamped Inductive Waveforms

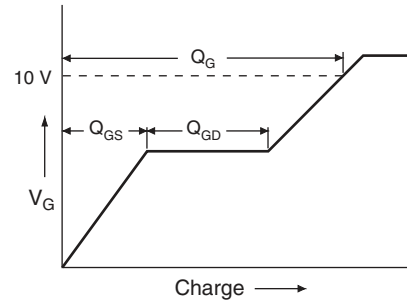


Fig. 15 - Basic Gate Charge Waveform

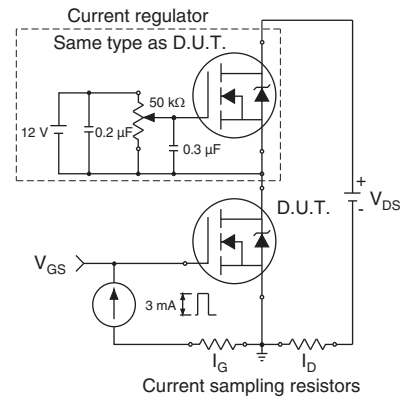
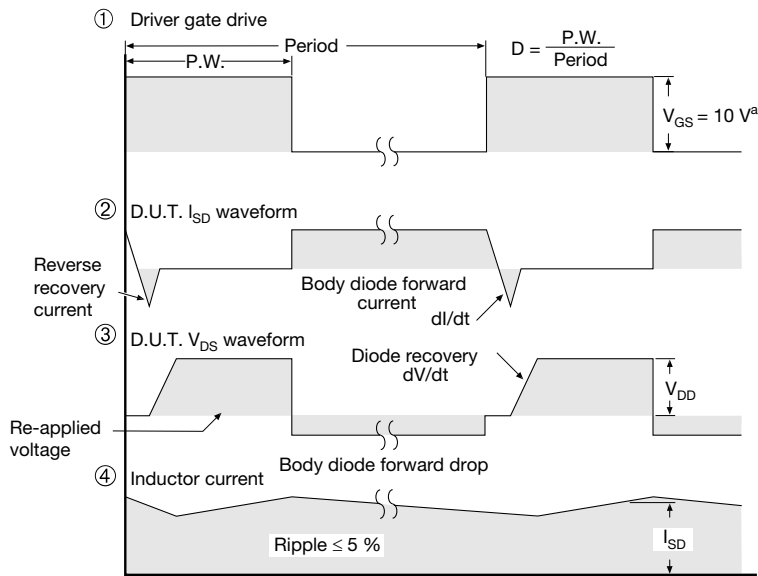
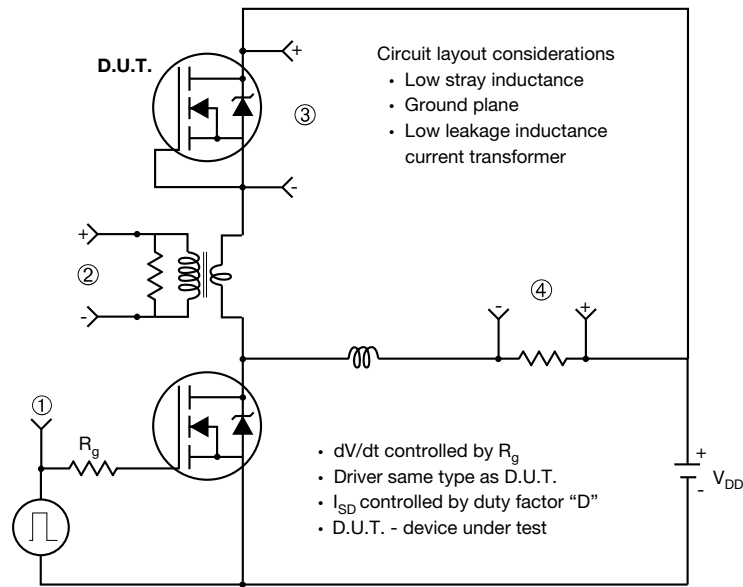


Fig. 16 - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit



Note

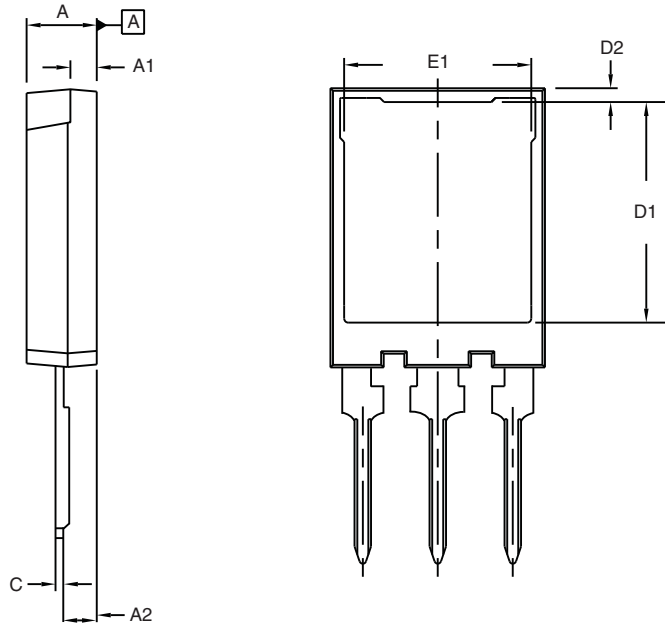
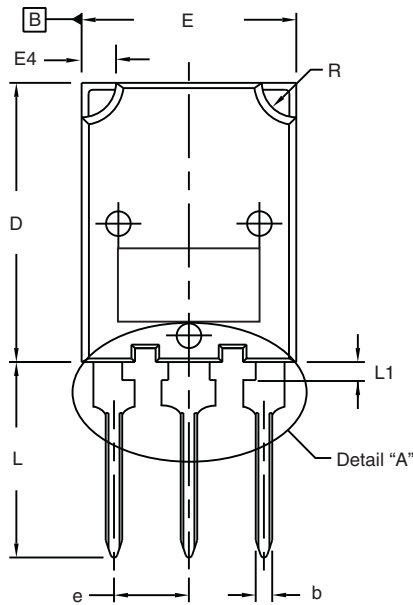
a. $V_{GS} = 5\text{ V}$ for logic level devices

Fig. 17 - For N-Channel

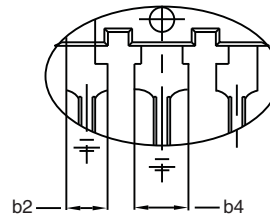
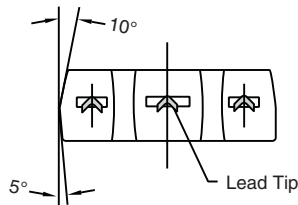
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TO-274AA (High Voltage)



⊕ 0.10 (0.25) Ⓜ B A Ⓜ



Detail "A"
Scale: 2:1

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.70	5.30	0.185	0.209
A1	1.50	2.50	0.059	0.098
A2	2.25	2.65	0.089	0.104
b	1.30	1.60	0.051	0.063
b2	1.80	2.20	0.071	0.087
b4	3.00	3.25	0.118	0.128
c ⁽¹⁾	0.38	0.89	0.015	0.035
D	19.80	20.80	0.780	0.819

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
D1	15.50	16.10	0.610	0.634
D2	0.70	1.30	0.028	0.051
E	15.10	16.10	0.594	0.634
E1	13.30	13.90	0.524	0.547
e	5.45 BSC		0.215 BSC	
L	13.70	14.70	0.539	0.579
L1	1.00	1.60	0.039	0.063
R	2.00	3.00	0.079	0.118

ECN: X17-0056-Rev. B, 27-Mar-17
DWG: 5975

Notes

- Dimensioning and tolerancing per ASME Y14.5M-1994
- 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 outer extremes of the plastic body
- Outline conforms to JEDEC® outline to TO-274AA
- (1) Dimension measured at tip of lead



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