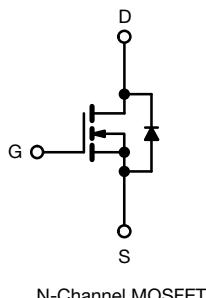
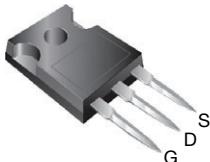


Power MOSFET

TO-247AC



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
HALOGEN
FREE
Available

PRODUCT SUMMARY

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

ORDERING INFORMATION

Package	TO-247AC
Lead (Pb)-free	SiHG20N50C-E3
Lead (Pb)-free and halogen-free	SiHG20N50C-GE3

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	500	V
Gate-source voltage	V_{GS}	± 30	
Continuous drain current ($T_J = 150$ °C) ^a	V_{GS} at 10 V	20	A
		11	
Pulsed drain current ^b	I_{DM}	80	
Linear derating factor		1.8	W/°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	°C
Soldering recommendations (peak temperature) ^d	For 10 s	300	

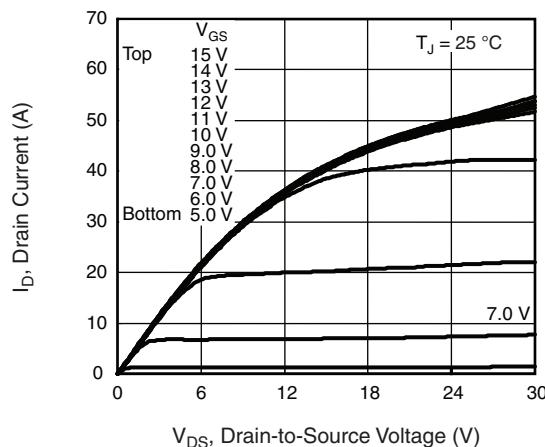
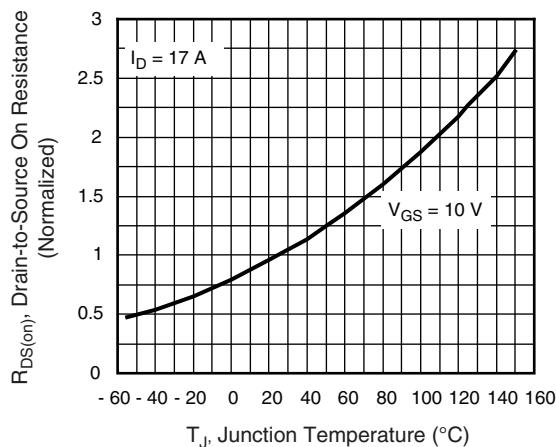
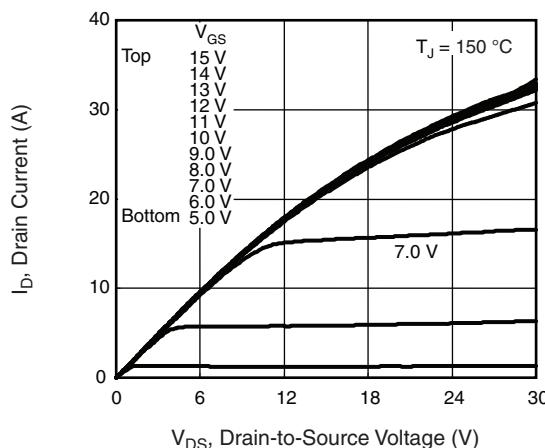
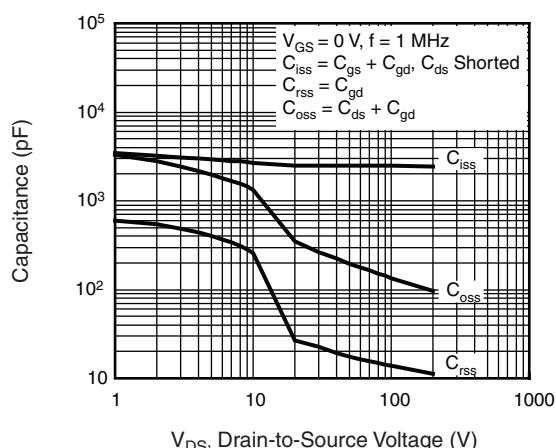
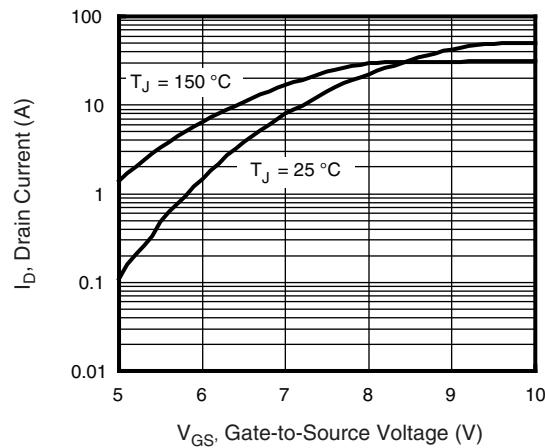
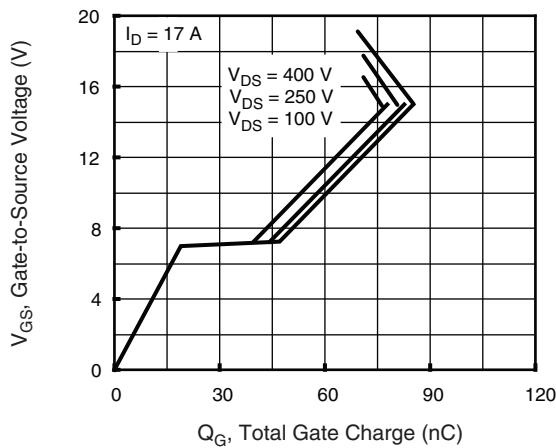
Notes

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

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum junction-to-ambient	R_{thJA}	-	40	°C/W
Maximum junction-to-case (drain)	R_{thJC}	-	0.5	

SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static								
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$		500	-	-	V	
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	Reference to 25°C , $I_D = 1\text{ mA}$		-	0.7	-	$\text{V}/^\circ\text{C}$	
Gate-source threshold voltage (N)	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$		3.0	-	5.0	V	
Gate-source leakage	I_{GSS}	$V_{GS} = \pm 30\text{ V}$		-	-	± 100	nA	
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 500\text{ V}$, $V_{GS} = 0\text{ V}$		-	-	25	μA	
		$V_{DS} = 400\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125^\circ\text{C}$		-	-	250		
Drain-source on-state resistance	$R_{DS(\text{on})}$	$V_{GS} = 10\text{ V}$	$I_D = 10\text{ A}$	-	0.225	0.270	Ω	
Forward transconductance	g_{fs}	$V_{DS} = 50\text{ V}$, $I_D = 10\text{ A}$		-	6.4	-	S	
Dynamic								
Input capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$		-	2451	2942	pF	
Output capacitance	C_{oss}			-	300	360		
Reverse transfer capacitance	C_{rss}			-	26	32		
Total gate charge	Q_g	$V_{GS} = 10\text{ V}$	$I_D = 18\text{ A}$, $V_{DS} = 400\text{ V}$	-	65	76	nC	
Gate-source charge	Q_{gs}			-	21	-		
Gate-drain charge	Q_{gd}			-	29	-		
Turn-on delay time	$t_{d(\text{on})}$	$V_{DD} = 250\text{ V}$, $I_D = 18\text{ A}$, $R_g = 9.1\text{ }\Omega$		-	80	-	ns	
Rise time	t_r			-	27	-		
Turn-off delay time	$t_{d(\text{off})}$			-	32	-		
Fall time	t_f			-	44	-		
Gate input resistance	R_g	$f = 1\text{ MHz}$, 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}	$T_J = 25^\circ\text{C}$, $I_S = 18\text{ A}$, $V_{GS} = 0\text{ V}$		-	-	1.5	V	
Reverse recovery time	t_{rr}	$T_J = 25^\circ\text{C}$, $I_F = I_S$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 35\text{ V}$		-	503	-	ns	
Reverse recovery charge	Q_{rr}			-	6.7	-		
Reverse recovery current	I_{RRM}			-	30	-		

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Fig. 1 - 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

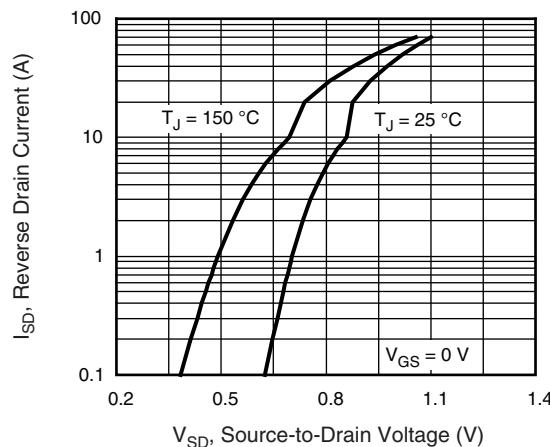


Fig. 7 - Typical Source-Drain Diode Forward Voltage

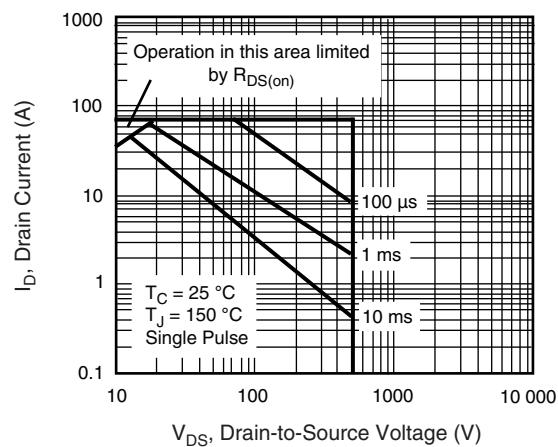


Fig. 8 - Maximum Safe Operating Area

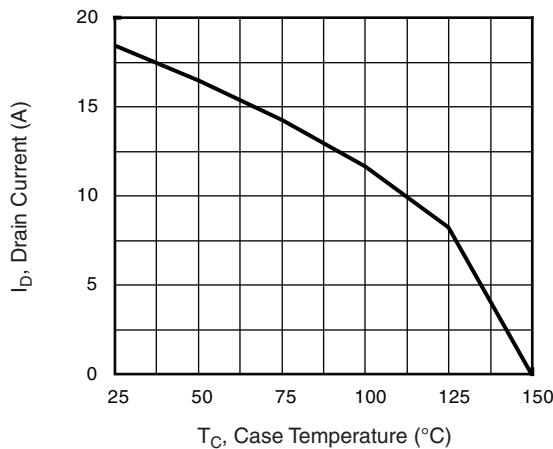


Fig. 9 - Maximum Drain Current vs. Case Temperature

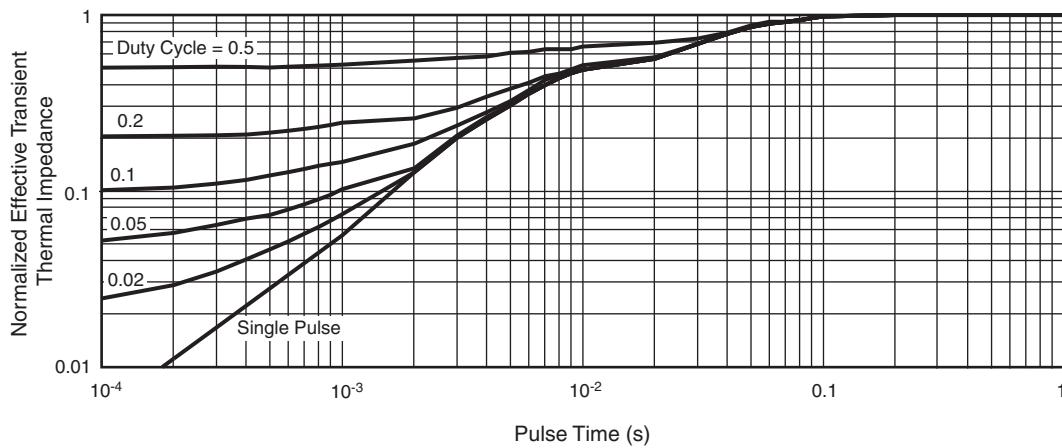
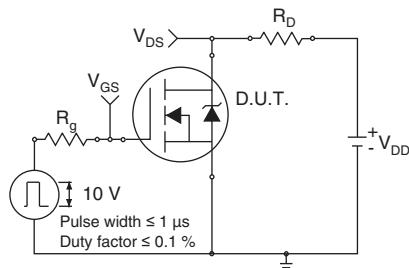
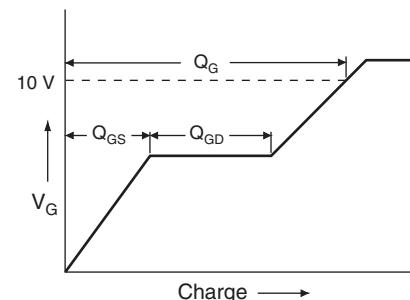
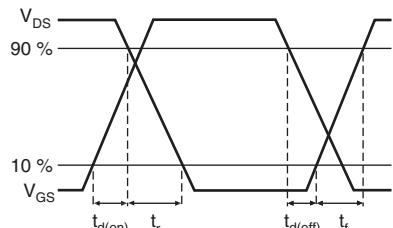
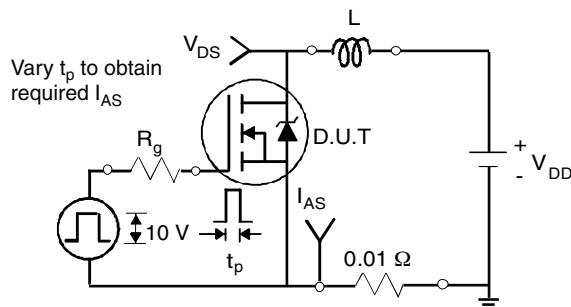
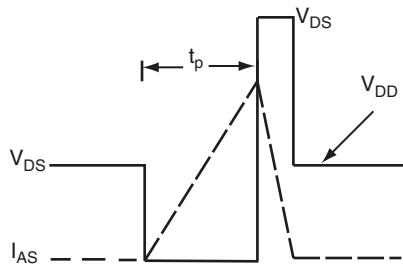
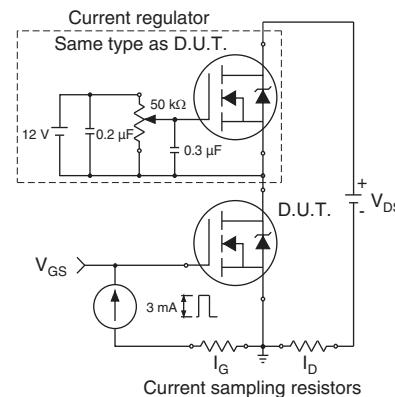
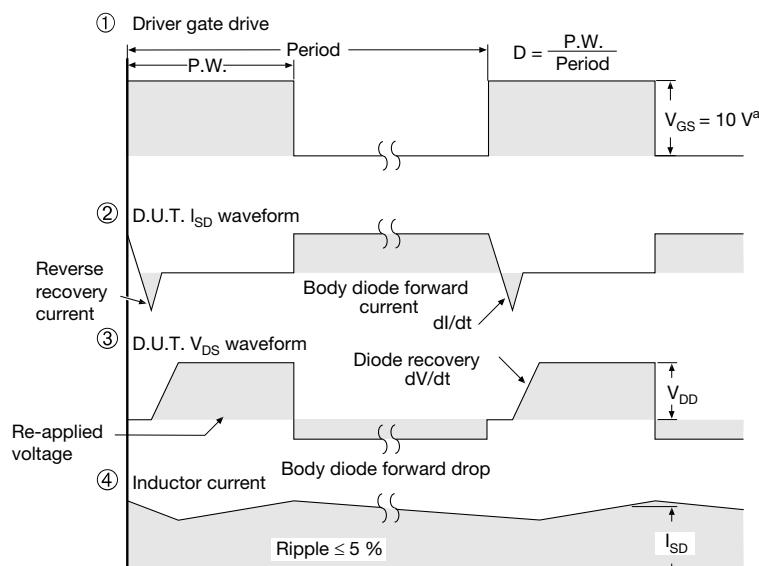
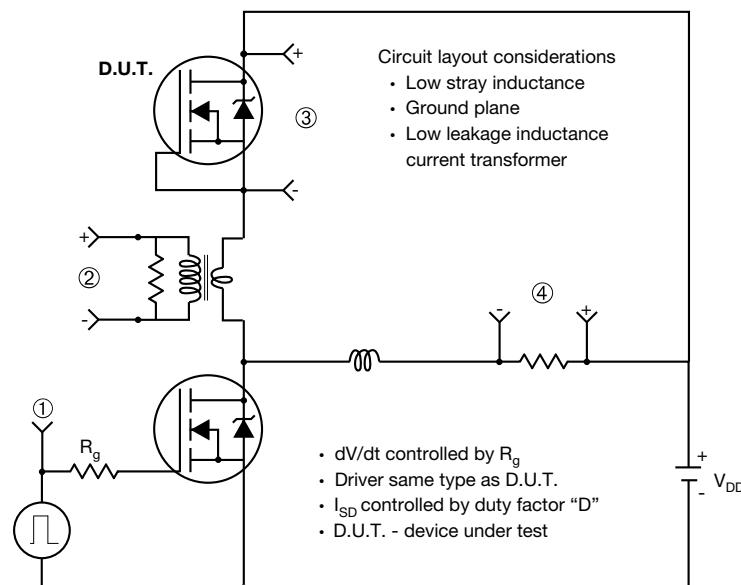


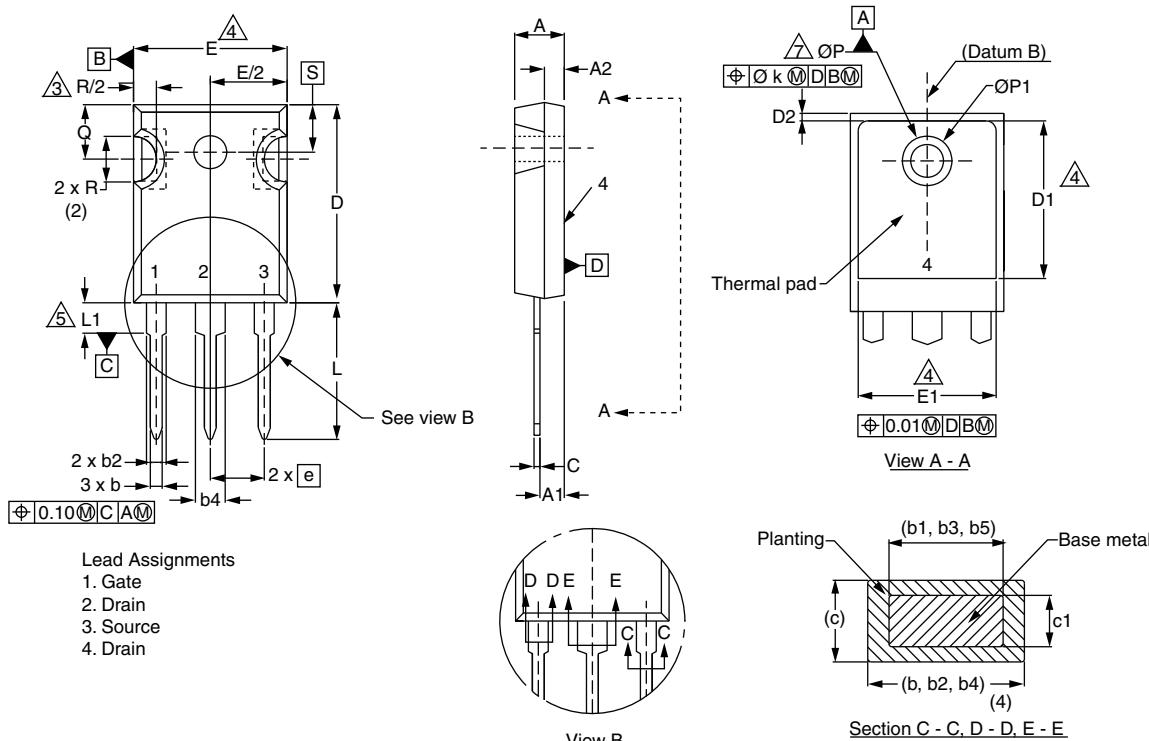
Fig. 10 - Normalized Thermal Transient Impedance, Junction-to-Case (TO-247)


Fig. 11 - Switching Time Test Circuit

Fig. 15 - Basic Gate Charge Waveform

Fig. 12 - Switching Time Waveforms

Fig. 13 - Unclamped Inductive Test Circuit

Fig. 14 - Unclamped Inductive Waveforms

Fig. 16 - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit

Fig. 17 - For N-Channel

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TO-247AC (High Voltage)



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.58	5.31	0.180	0.209
A1	2.21	2.59	0.087	0.102
A2	1.17	2.49	0.046	0.098
b	0.99	1.40	0.039	0.055
b1	0.99	1.35	0.039	0.053
b2	1.53	2.39	0.060	0.094
b3	1.65	2.37	0.065	0.093
b4	2.42	3.43	0.095	0.135
b5	2.59	3.38	0.102	0.133
c	0.38	0.86	0.015	0.034
c1	0.38	0.76	0.015	0.030
D	19.71	20.82	0.776	0.820
D1	13.08	-	0.515	-

ECN: X13-0103-Rev. D, 01-Jul-13
DWG: 5971

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
D2	0.51	1.30	0.020	0.051
E	15.29	15.87	0.602	0.625
E1	13.72	-	0.540	-
e	5.46 BSC		0.215 BSC	
Ø k	0.254		0.010	
L	14.20	16.25	0.559	0.640
L1	3.71	4.29	0.146	0.169
N	7.62 BSC		0.300 BSC	
Ø P	3.51	3.66	0.138	0.144
Ø P1	-	7.39	-	0.291
Q	5.31	5.69	0.209	0.224
R	4.52	5.49	0.178	0.216
S	5.51 BSC		0.217 BSC	

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. Contour of slot optional.
3. 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 outermost extremes of the plastic body.
4. Thermal pad contour optional with dimensions D1 and E1.
5. Lead finish uncontrolled in L1.
6. Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154").
7. Outline conforms to JEDEC outline TO-247 with exception of dimension c.
8. Xian and Mingxin actually photo.



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