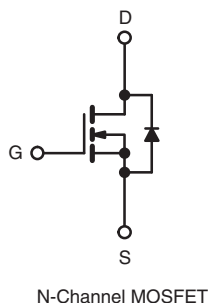
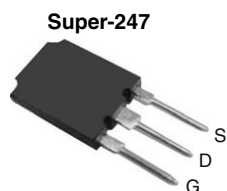


D Series Power MOSFET

PRODUCT SUMMARY

V_{DS} (V) at T_J max.	550	
$R_{DS(on)}$ max. at 25 °C (Ω)	$V_{GS} = 10$ V	0.130
Q_g max. (nC)	125	
Q_{gs} (nC)	23	
Q_{gd} (nC)	37	
Configuration	Single	



FEATURES

- Optimal Design
 - Low Area specific On-Resistance
 - Low Input Capacitance (C_{iss})
 - Reduced Capacitive Switching Losses
 - High Body Diode Ruggedness
 - Avalanche Energy Rated (U_{IS})
- Optimal Efficiency and Operation
 - Low Cost
 - Simple Gate Drive Circuitry
 - Low Figure-Of-Merit (FOM): $R_{on} \times Q_g$
 - Fast Switching
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Consumer Electronics
 - Displays (LCD or Plasma TV)
- Server and Telecom Power Supplies
 - SMPS
- Industrial
 - Welding, Induction Heating, Motor Drives
- Battery Chargers

ORDERING INFORMATION

Package	Super-247
Lead (Pb)-free	SiHS36N50D-E3

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	
Gate-Source Voltage AC ($f > 1$ Hz)		30	
Continuous Drain Current ($T_J = 150$ °C)	V_{GS} at 10 V	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current ^a	I_{DM}	112	
Linear Derating Factor		3.6	W/°C
Single Pulse Avalanche Energy ^b	E_{AS}	332	mJ
Maximum Power Dissipation	P_D	446	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	°C
Drain-Source Voltage Slope	dV/dt	24	V/ns
Reverse Diode dV/dt ^d		0.1	
Soldering Recommendations (Peak Temperature)	for 10 s	300°	°C

Notes

- Repetitive rating; pulse width limited by maximum junction temperature.
- $V_{DD} = 50$ V, starting $T_J = 25$ °C, $L = 2.3$ mH, $R_g = 25$ Ω , $I_{AS} = 17$ A.
- 1.6 mm from case.
- $I_{SD} \leq I_D$, starting $T_J = 25$ °C.

THERMAL RESISTANCE RATINGS

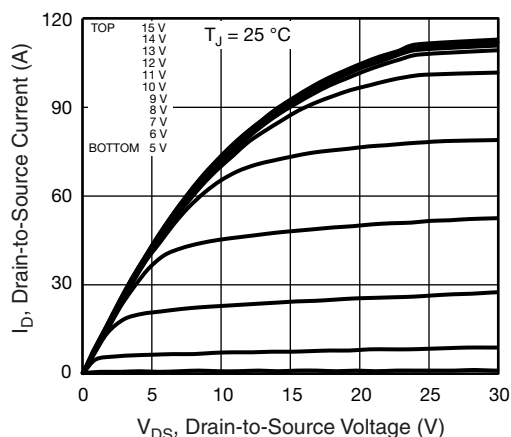
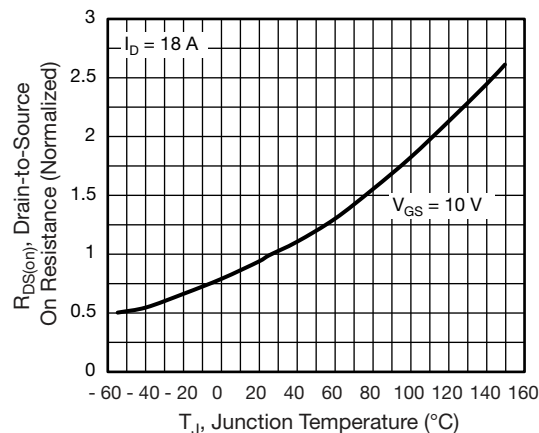
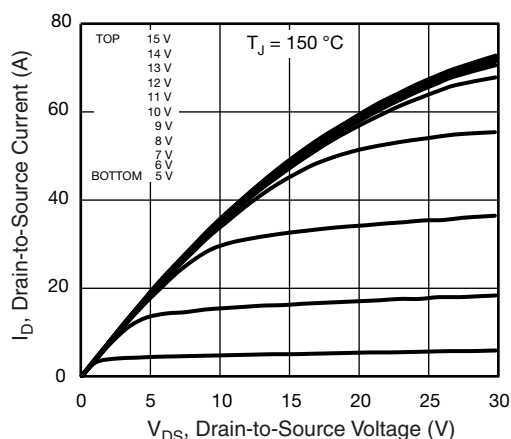
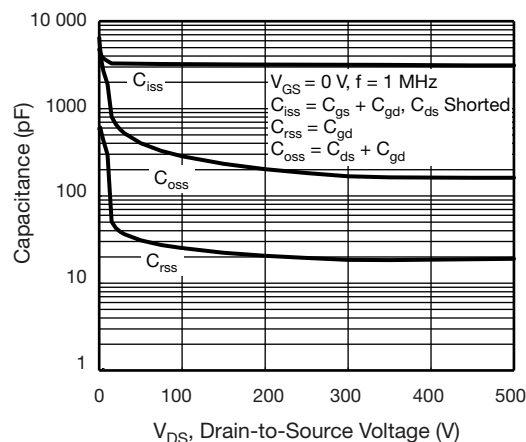
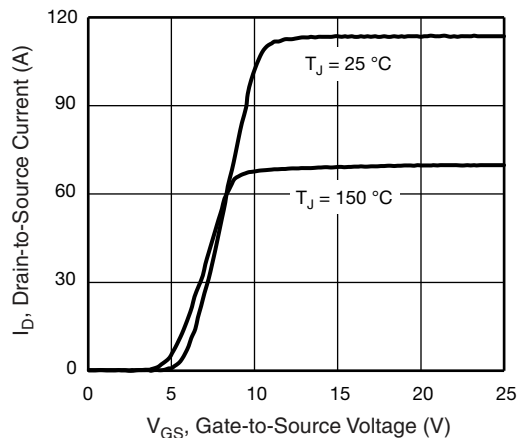
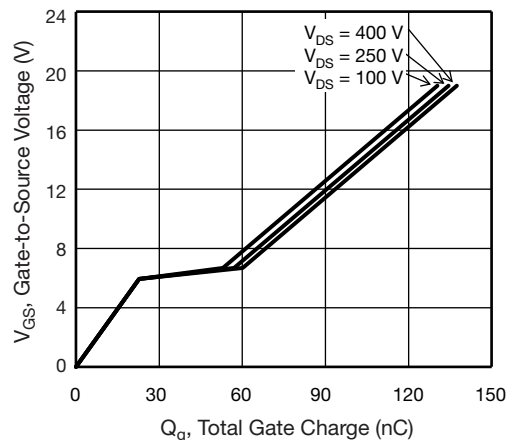
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	-	40	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	-	0.28	

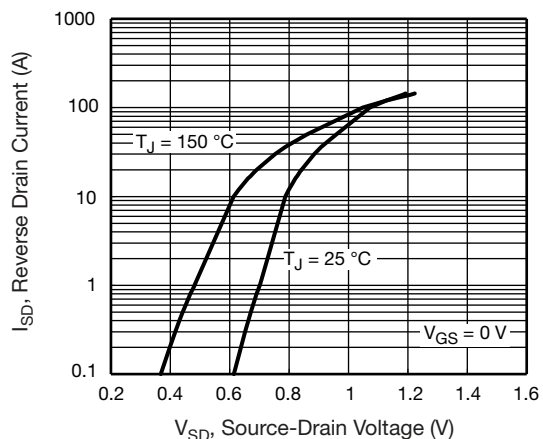
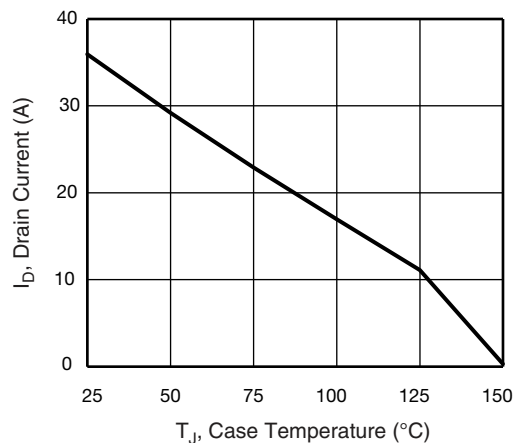
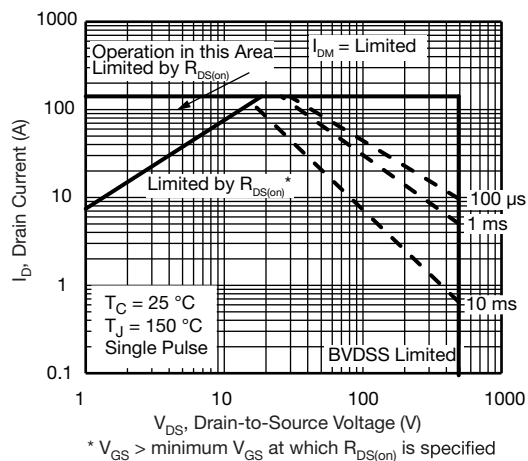
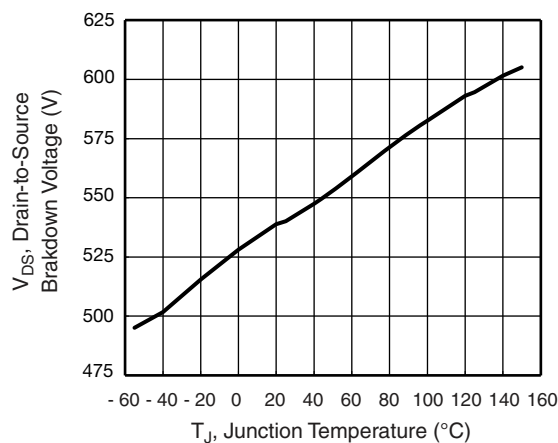
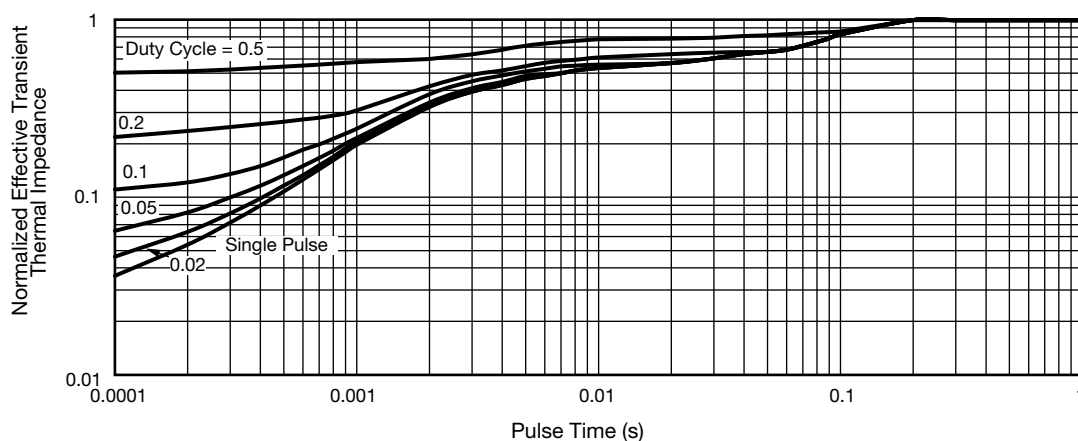
SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

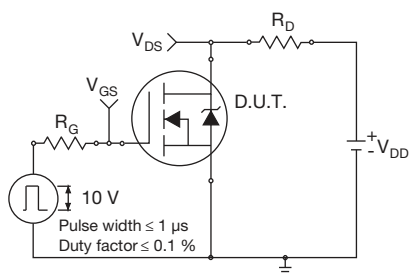
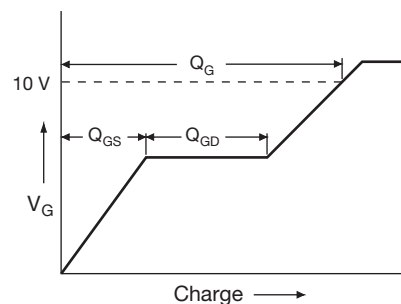
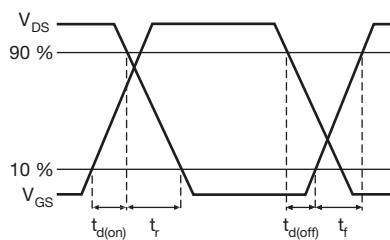
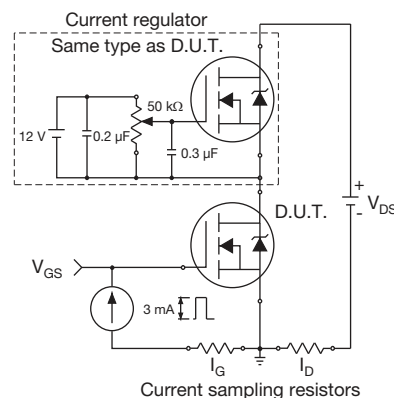
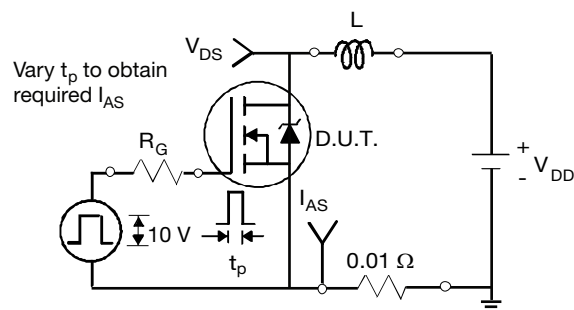
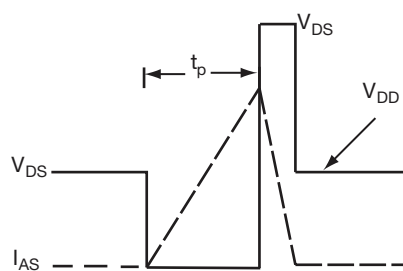
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	500	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^{\circ}\text{C}$, $I_D = 250\text{ }\mu\text{A}$	-	0.52	-	V/°C
Gate Threshold Voltage (N)	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	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}	$V_{DS} = 500\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 400\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$	-	-	10	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 18\text{ A}$	-	0.105	0.130	Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = 50\text{ V}$, $I_D = 18\text{ A}$	-	12.8	-	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 100\text{ V}$, $f = 1\text{ MHz}$	-	3233	-	pF
Output Capacitance	C_{oss}		-	285	-	
Reverse Transfer Capacitance	C_{rss}		-	25	-	
Effective Output Capacitance, Energy Related ^a	$C_{o(er)}$	$V_{GS} = 0\text{ V}$, $V_{DS} = 0\text{ V to } 400\text{ V}$	-	240	-	
Effective Output Capacitance, Time Related ^b	$C_{o(tr)}$		-	352	-	
Total Gate Charge	Q_g	$V_{GS} = 10\text{ V}$, $I_D = 18\text{ A}$, $V_{DS} = 400\text{ V}$	-	83	125	nC
Gate-Source Charge	Q_{gs}		-	23	-	
Gate-Drain Charge	Q_{gd}		-	37	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 400\text{ V}$, $I_D = 18\text{ A}$, $V_{GS} = 10\text{ V}$, $R_g = 9.1\text{ }\Omega$	-	33	66	ns
Rise Time	t_r		-	89	134	
Turn-Off Delay Time	$t_{d(off)}$		-	79	119	
Fall Time	t_f		-	68	102	
Gate Input Resistance	R_g	$f = 1\text{ MHz}$, open drain	-	1.8	-	Ω
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	36	A
Pulsed Diode Forward Current	I_{SM}		-	-	144	
Diode Forward Voltage	V_{SD}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_S = 18\text{ A}$, $V_{GS} = 0\text{ V}$	-	-	1.2	V
Reverse Recovery Time	t_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_F = I_S = 18\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$, $V_R = 20\text{ V}$	-	490	-	ns
Reverse Recovery Charge	Q_{rr}		-	8.2	-	μC
Reverse Recovery Current	I_{RRM}		-	31	-	A

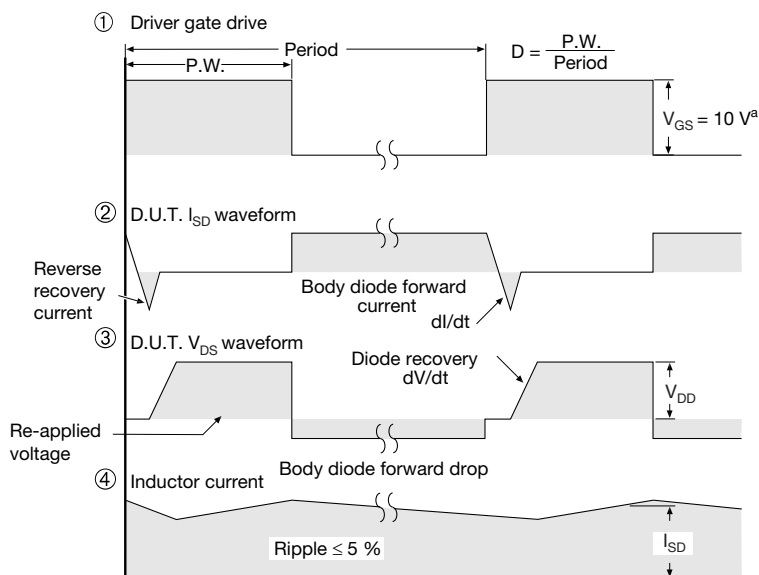
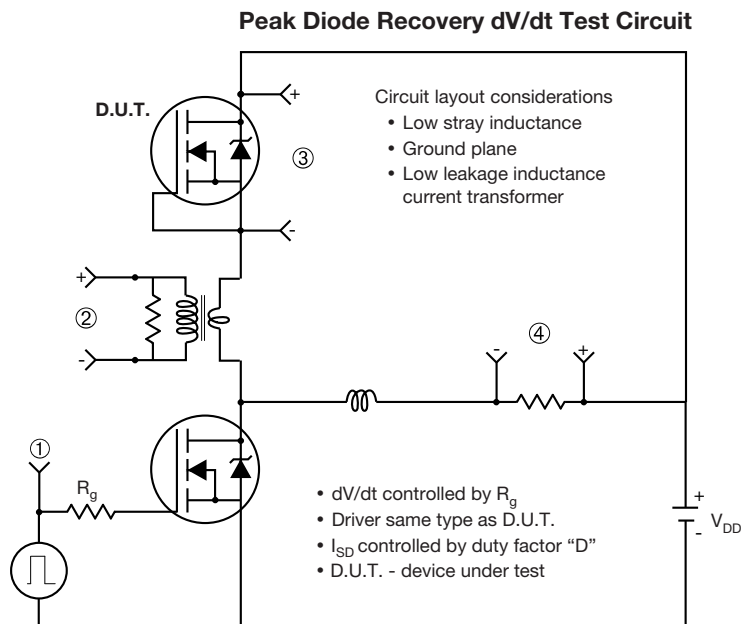
Notes

- a. $C_{oss(er)}$ is a fixed capacitance that gives the same energy as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS} .
b. $C_{oss(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS} .

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Fig. 1 - Typical Output Characteristics

Fig. 4 - Normalized On-Resistance vs. Temperature

Fig. 2 - Typical Output Characteristics

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. 9 - Maximum Drain Current vs. Case Temperature

Fig. 8 - Maximum Safe Operating Area

Fig. 10 - Temperature vs. Drain-to-Source Voltage

Fig. 11 - Normalized Thermal Transient Impedance, Junction-to-Case


Fig. 12 - Switching Time Test Circuit

Fig. 16 - Basic Gate Charge Waveform

Fig. 13 - Switching Time Waveforms

Fig. 17 - Gate Charge Test Circuit

Fig. 14 - Unclamped Inductive Test Circuit

Fig. 15 - Unclamped Inductive Waveforms



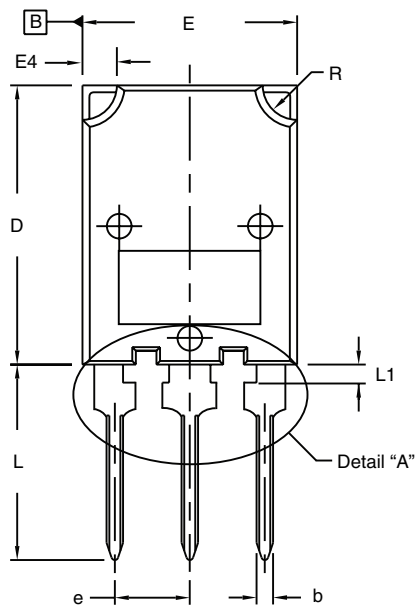
Note

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

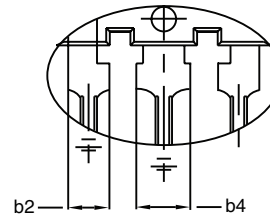
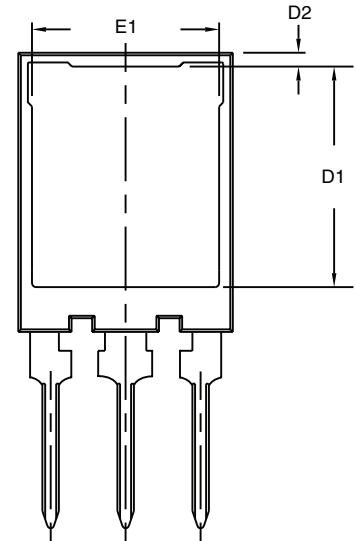
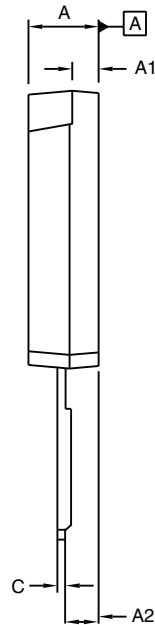
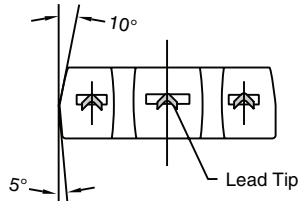
Fig. 18 - For N-Channel

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TO-274AA (HIGH VOLTAGE)



⌀ 0.10 (0.25) ⌀ B A ⌀



Detail "A"
Scale: 2:1

	MILLIMETERS		INCHES	
DIM.	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	0.80	1.20	0.031	0.047
D	19.80	20.80	0.780	0.819

	MILLIMETERS		INCHES	
DIM.	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: S-82247-Rev. A, 06-Oct-08
DWG: 5975

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. 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.
3. Outline conforms to JEDEC outline to TO-274AA.



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