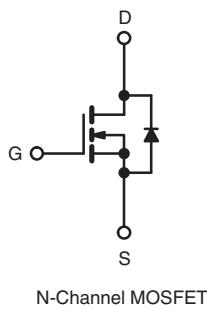
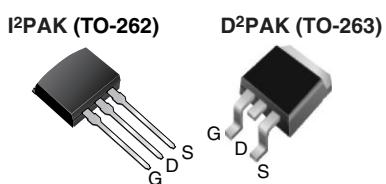


Power MOSFET

PRODUCT SUMMARY	
V _{DS} (V)	500
R _{DSON} (Max.) (Ω)	V _{GS} = 10 V 3.0
Q _G (Max.) (nC)	17
Q _{GS} (nC)	4.3
Q _{GD} (nC)	8.5
Configuration	Single



FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Low Gate Charge Q_G Results in Simple Drive Requirement
- Improved Gate, Avalanche and Dynamic dV/dt Ruggedness
- Fully Characterized Capacitance and Avalanche Voltage and Current
- Effective C_{OSS} specified
- Compliant to RoHS Directive 2002/95/EC



APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply
- High Speed Power Switching

TYPICAL SMPS TOPOLOGIES

- Two Transistor Forward
- Half Bridge and Full Bridge

ORDERING INFORMATION			
Package	D²PAK (TO-263)	I²PAK (TO-262)	
Lead (Pb)-free and Halogen-free	SiHF820AS-GE3	SiHF820AL-GE3	
Lead (Pb)-free	IRF820ASPbF SiHF820AS-E3	IRF820ALPbF SiHF820AL-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	
Continuous Drain Current	V _{GS} at 10 V	T _C = 25 °C	2.5	A
		T _C = 100 °C	1.6	
Pulsed Drain Current ^{a, e}		I _{DM}	10	
Linear Derating Factor			0.4	W/°C
Single Pulse Avalanche Energy ^{b, e}		E _{AS}	140	mJ
Avalanche Current ^a		I _{AR}	2.5	A
Repetitive Avalanche Energy ^a		E _{AR}	5.0	mJ
Maximum Power Dissipation	T _C = 25 °C	P _D	50	W
Peak Diode Recovery dV/dt ^{c, e}		dV/dt	3.4	V/ns
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature)	for 10 s		300 ^d	
Mounting Torque	6-32 or M3 screw		10	lbf · in
			1.1	N · m

Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- Starting T_J = 25 °C, L = 45 mH, R_g = 25 Ω, I_{AS} = 2.5 A (see fig. 12).
- I_{SD} ≤ 2.5 A, dI/dt ≤ 270 A/μs, V_{DD} ≤ V_{DS}, T_J ≤ 150 °C.
- 1.6 mm from case.
- Uses IRF820A, SiHF820A data and test conditions.

* Pb containing terminations are not RoHS compliant, exemptions may apply

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient (PCB Mounted, steady-state) ^a	R _{thJA}	-	62	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	-	2.5	

Note

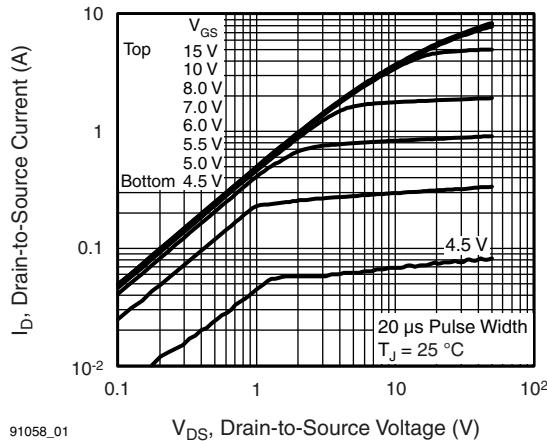
a. When mounted on 1" square PCB (FR-4 or G-10 material).

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

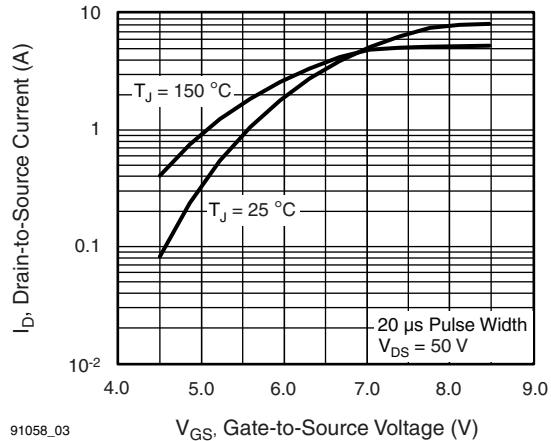
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0, I _D = 250 μA		500	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA ^d		-	0.60	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		2.0	-	4.5	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 = 1.5 A ^b	-	-	3.0	Ω
Forward Transconductance	g _{fs}	V _{DS} = 50 V, I _D = 1.5 A ^d		1.4	-	-	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1.0 MHz, see fig. 5 ^d		-	340	-	pF
Output Capacitance	C _{oss}			-	53	-	
Reverse Transfer Capacitance	C _{rss}			-	2.7	-	
Output Capacitance	C _{oss}	V _{GS} = 0 V	V _{DS} = 1.0 V, f = 1.0 MHz	-	490	-	nC
			V _{DS} = 400 V, f = 1.0 MHz	-	15	-	
Effective Output Capacitance	C _{oss eff.}		V _{DS} = 0 V to 400 V ^{c, d}	-	28	-	
Total Gate Charge	Q _g	V _{GS} = 10 V	I _D = 2.5 A, V _{DS} = 400 V, see fig. 6 and 13 ^{b, d}	-	-	17	ns
Gate-Source Charge	Q _{gs}			-	-	4.3	
Gate-Drain Charge	Q _{gd}			-	-	8.5	
Turn-On Delay Time	t _{d(on)}			-	8.1	-	
Rise Time	t _r	V _{DD} = 250 V, I _D = 2.5 A, R _g = 21 Ω, R _D = 97 Ω, see fig. 10 ^{b, d}	-	12	-	ns	
Turn-Off Delay Time	t _{d(off)}		-	16	-		
Fall Time	t _f		-	13	-		
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	2.5	A
Pulsed Diode Forward Current ^a	I _{SM}			-	-	10	
Body Diode Voltage	V _{SD}	T _J = 25 °C, I _S = 2.5 A, V _{GS} = 0 V ^b		-	-	1.6	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = 2.5 A, dI/dt = 100 A/μs ^{b, d}		-	330	500	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	760	1140	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L _S and L _D)					

Notes

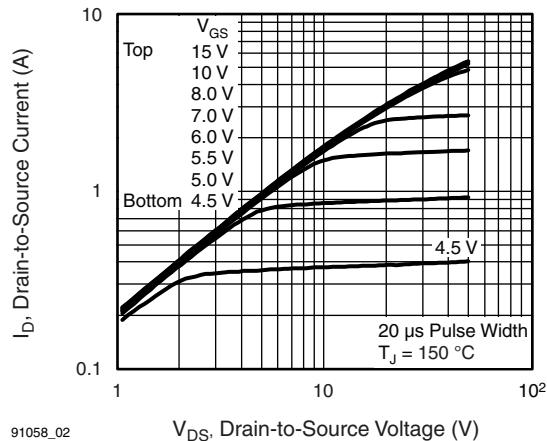
- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- b. Pulse width ≤ 300 μs; duty cycle ≤ 2 %.
- c. C_{oss eff.} is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DS}.
- d. Uses IRF820A/SiHF820A data and test conditions.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)


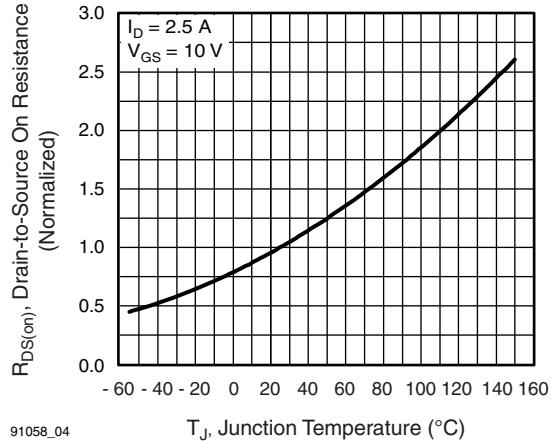
91058_01

 V_{DS} , Drain-to-Source Voltage (V)**Fig. 1 - Typical Output Characteristics**

91058_03

 V_{GS} , Gate-to-Source Voltage (V)**Fig. 3 - Typical Transfer Characteristics**

91058_02

 V_{DS} , Drain-to-Source Voltage (V)**Fig. 2 - Typical Output Characteristics**

91058_04

 T_J , Junction Temperature (°C)**Fig. 4 - Normalized On-Resistance vs. Temperature**

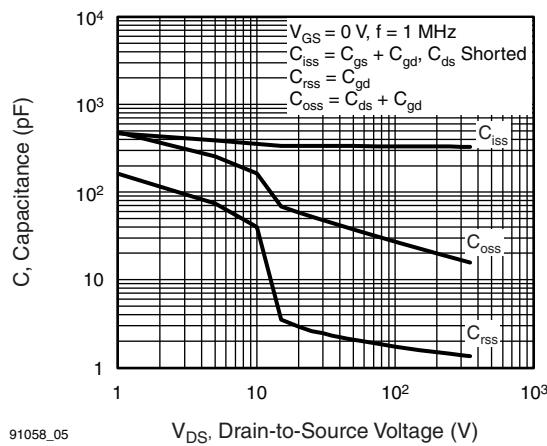


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

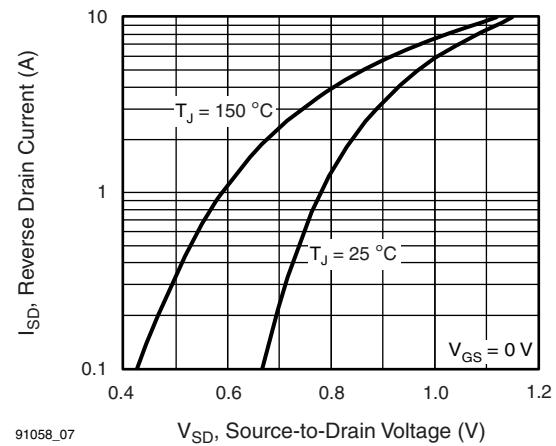


Fig. 7 - Typical Source-Drain Diode Forward Voltage

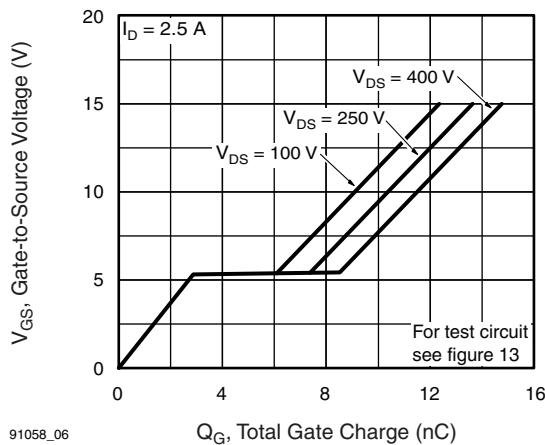


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

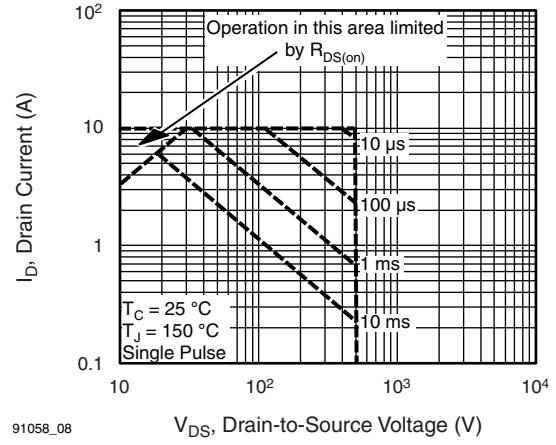
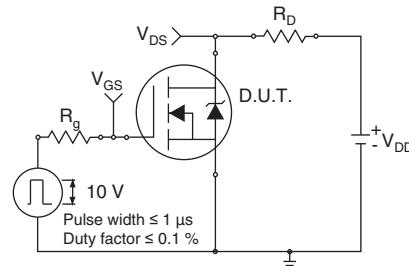
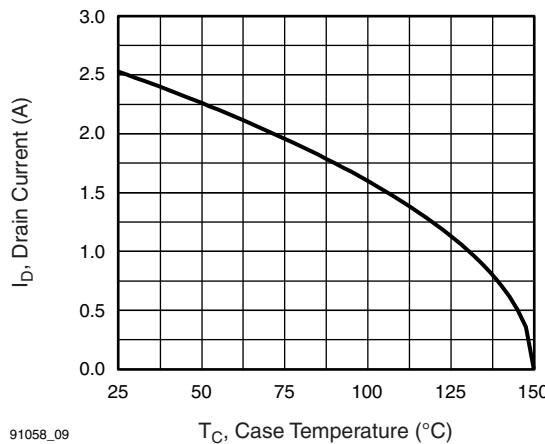
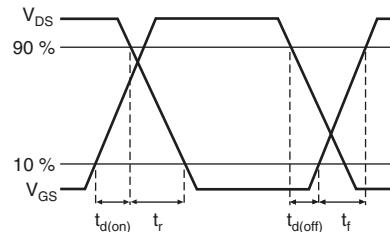
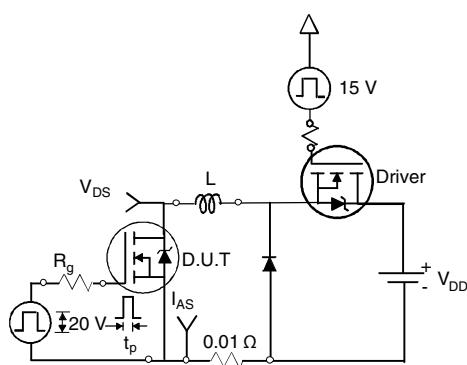
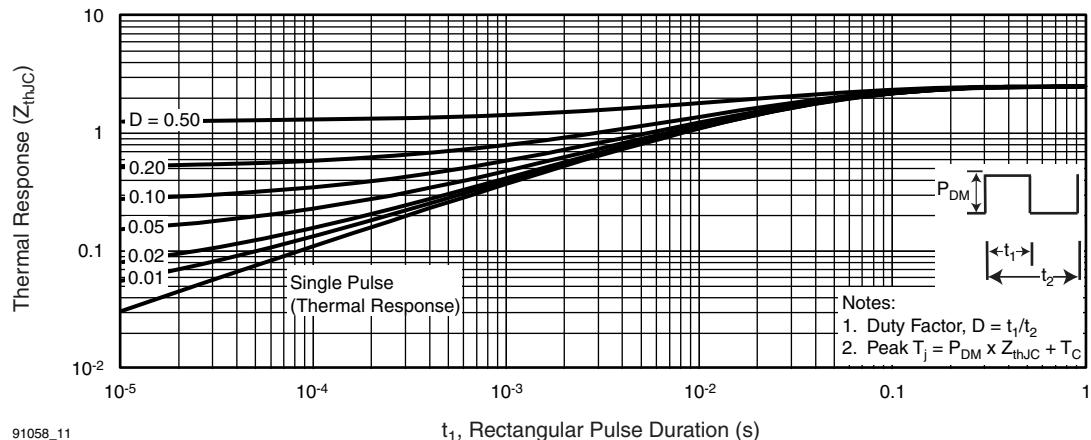
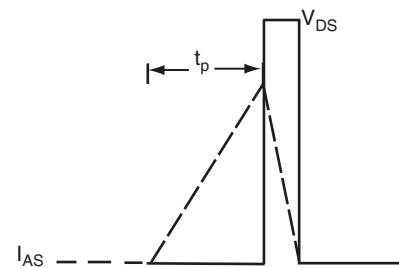


Fig. 8 - Maximum Safe Operating Area


Fig. 10a - Switching Time Test Circuit

Fig. 10b - Switching Time Waveforms

Fig. 12a - Unclamped Inductive Test Circuit

Fig. 12b - Unclamped Inductive Waveforms

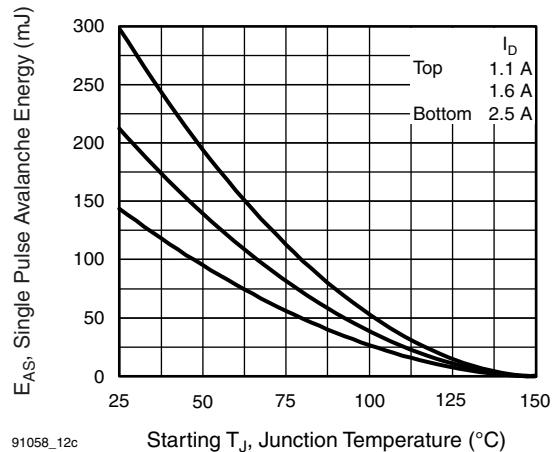


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

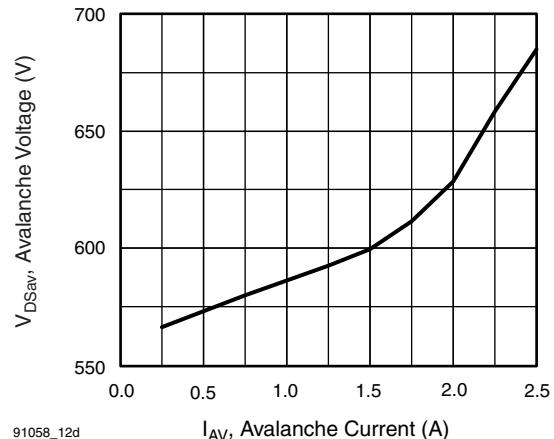


Fig. 12d - Basic Gate Charge Waveform

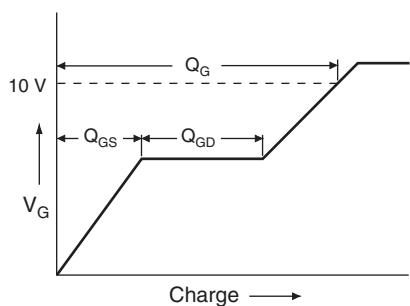


Fig. 13a - Maximum Avalanche Energy vs. Drain Current

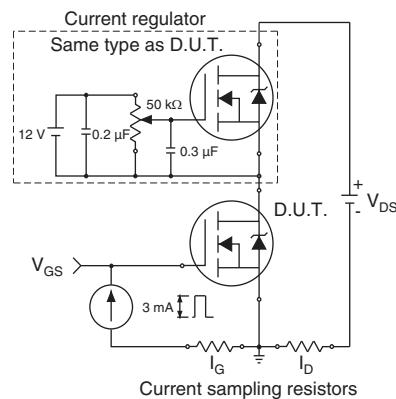
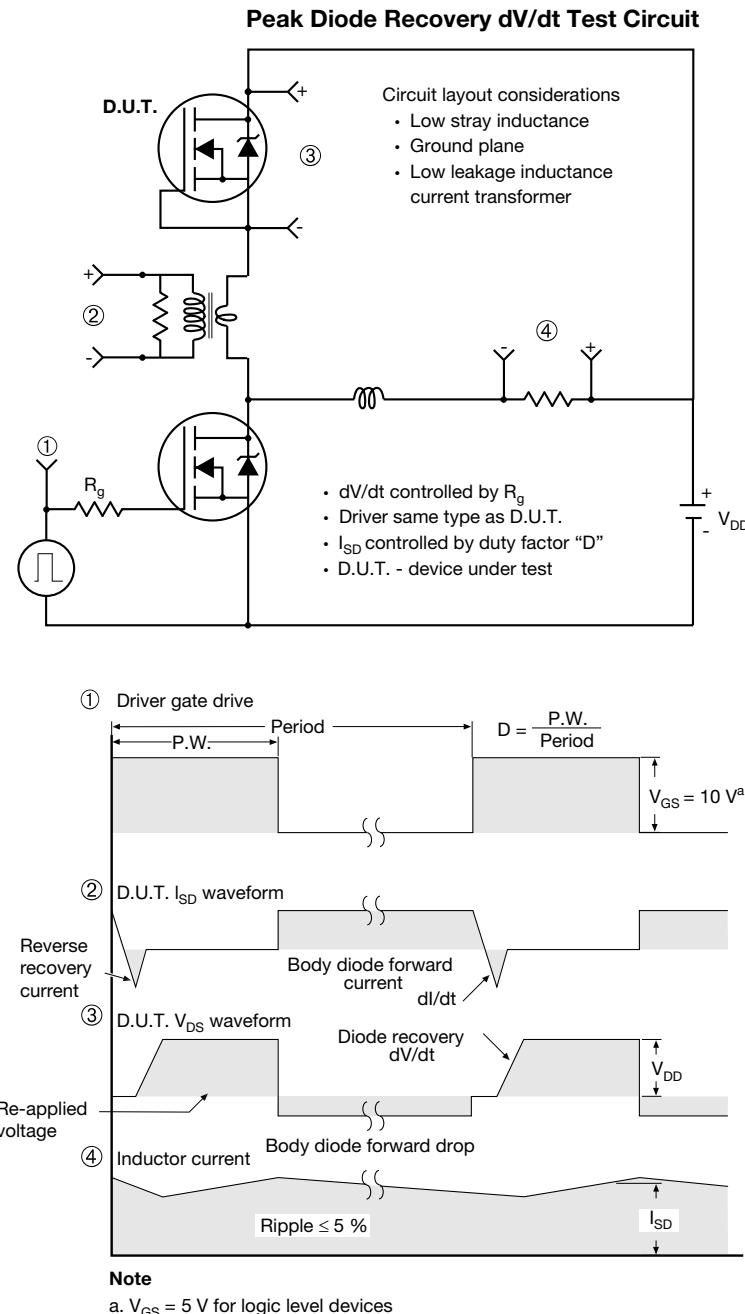


Fig. 13b - Gate Charge Test Circuit


Fig. 14 - For N-Channel

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TO-263AB (HIGH VOLTAGE)



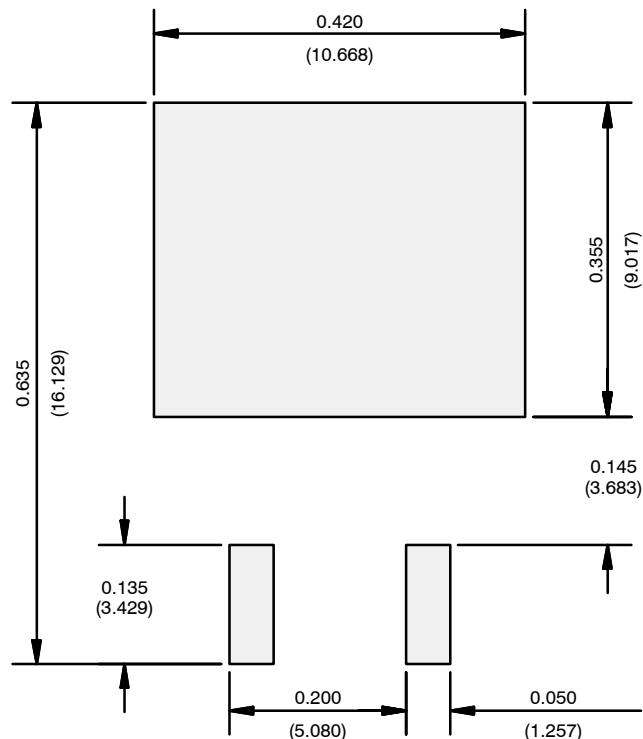
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b1	0.51	0.89	0.020	0.035
b2	1.14	1.78	0.045	0.070
b3	1.14	1.73	0.045	0.068
c	0.38	0.74	0.015	0.029
c1	0.38	0.58	0.015	0.023
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380

ECN: S-82110-Rev. A, 15-Sep-08
DWG: 5970

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
E	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208

Notes

- Dimensioning and tolerancing per ASME Y14.5M-1994.
- Dimensions are shown in millimeters (inches).
- 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 outmost extremes of the plastic body at datum A.
- Thermal PAD contour optional within dimension E, L1, D1 and E1.
- Dimension b1 and c1 apply to base metal only.
- Datum A and B to be determined at datum plane H.
- Outline conforms to JEDEC outline to TO-263AB.

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead

Recommended Minimum Pads
Dimensions in Inches/(mm)

[Return to Index](#)



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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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