

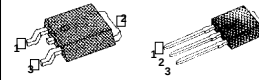
FEATURES

- ◆ Avalanche Rugged Technology
- ◆ Rugged Gate Oxide Technology
- ◆ Lower Input Capacitance
- ◆ Improved Gate Charge
- ◆ Extended Safe Operating Area
- ◆ Lower Leakage Current: 10μA (Max.) @ $V_{DS} = 100V$
- ◆ Lower $R_{DS(on)}$: 0.101Ω (Typ.)

$$BV_{DSS} = 100 V$$

$$R_{DS(on)} = 0.12\Omega$$

$$I_D = 13 A$$

D-PAK**I-PAK**

1. Gate 2. Drain 3. Source

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V_{DSS}	Drain-to-Source Voltage	100	V
I_D	Continuous Drain Current ($T_C=25^\circ C$)	13	A
	Continuous Drain Current ($T_C=100^\circ C$)	8	
I_{DM}	Drain Current-Pulsed (1)	45	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (2)	225	mJ
I_{AR}	Avalanche Current (1)	13	A
E_{AR}	Repetitive Avalanche Energy (1)	4.6	mJ
dv/dt	Peak Diode Recovery dv/dt (3)	6.5	V/ns
P_D	Total Power Dissipation ($T_A=25^\circ C$) *	2.5	W
	Total Power Dissipation ($T_C=25^\circ C$)	46	W
	Linear Derating Factor	0.37	W/ $^\circ C$
T_J, T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	$^\circ C$
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8. from case for 5-seconds	300	

Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	2.7	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient *	--	50	
$R_{\theta JA}$	Junction-to-Ambient	--	110	

* When mounted on the minimum pad size recommended (PCB Mount).

Rev. B

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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	100	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta BV/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	0.1	--	V/°C	$I_D=250\mu A$ See Fig 7
$V_{GS(th)}$	Gate Threshold Voltage	1.0	--	2.0	V	$V_{DS}=5V, I_D=250\mu A$
I_{GSS}	Gate-Source Leakage, Forward	--	--	100	nA	$V_{GS}=20V$
	Gate-Source Leakage, Reverse	--	--	-100	nA	$V_{GS}=-20V$
I_{DSS}	Drain-to-Source Leakage Current	--	--	10	μA	$V_{DS}=100V$
		--	--	100	μA	$V_{DS}=80V, T_C=150^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-State Resistance	--	--	0.12	Ω	$V_{GS}=5V, I_D=6.5A$ (4)
g_{fs}	Forward Transconductance	--	10.1	--	S	$V_{DS}=40V, I_D=6.5A$ (4)
C_{iss}	Input Capacitance	--	580	755	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$ See Fig 5
C_{oss}	Output Capacitance	--	140	175		
C_{rss}	Reverse Transfer Capacitance	--	60	75		
$t_{d(on)}$	Turn-On Delay Time	--	10	30	ns	$V_{DD}=50V, I_D=14A,$ $R_G=6\Omega$ See Fig 13 (4) (5)
t_r	Rise Time	--	11	30		
$t_{d(off)}$	Turn-Off Delay Time	--	29	70		
t_f	Fall Time	--	15	40		
Q_g	Total Gate Charge	--	16.9	24	nC	$V_{DS}=80V, V_{GS}=5V,$ $I_D=14A$ See Fig 6 & Fig 12 (4) (5)
Q_{gs}	Gate-Source Charge	--	2.7	--		
Q_{gd}	Gate-Drain (. Miller.) Charge	--	9.7	--		

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I_S	Continuous Source Current	--	--	13	A	Integral reverse pn-diode in the MOSFET
I_{SM}	Pulsed-Source Current (1)	--	--	45		
V_{SD}	Diode Forward Voltage (4)	--	--	1.5	V	$T_J=25^\circ\text{C}, I_S=13A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	--	109	--	ns	$T_J=25^\circ\text{C}, I_F=14A$
Q_{rr}	Reverse Recovery Charge	--	0.41	--	μC	$di_F/dt=100A/\mu s$ (4)

Notes;

- (1) Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- (2) $L=2\text{mH}, I_{AS}=13A, V_{DD}=25V, R_G=27\Omega$, Starting $T_J=25^\circ\text{C}$
- (3) $I_{SD} \leq 14A, di/dt \leq 350A/\mu s, V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$
- (4) Pulse Test: Pulse Width = 250 μs , Duty Cycle $\leq 2\%$
- (5) Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

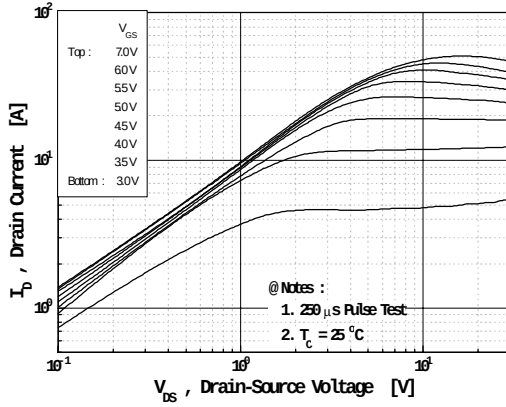


Fig 2. Transfer Characteristics

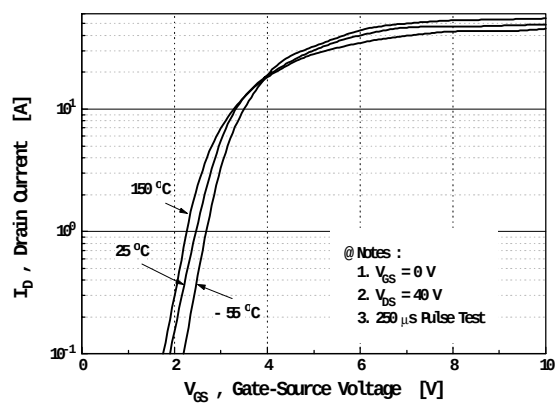


Fig 3. On-Resistance vs. Drain Current

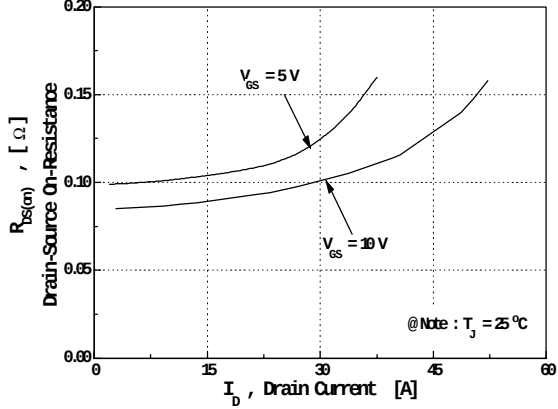


Fig 4. Source-Drain Diode Forward Voltage

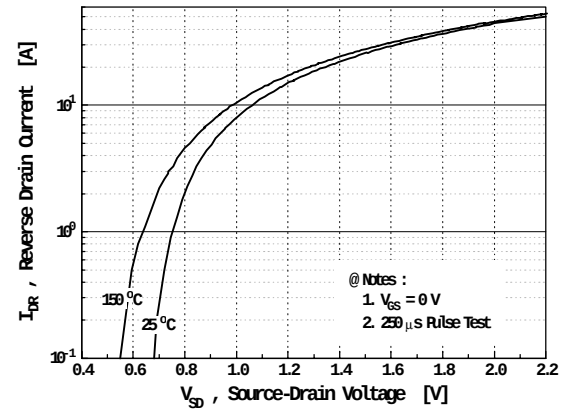


Fig 5. Capacitance vs. Drain-Source Voltage

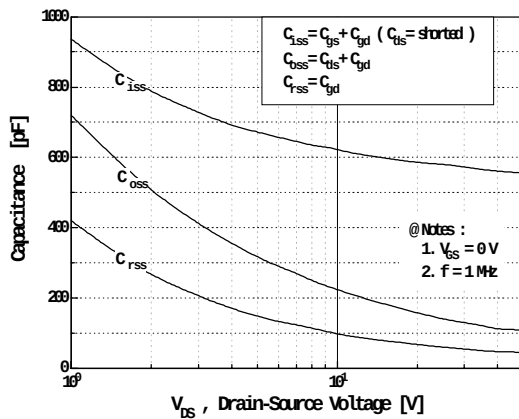


Fig 6. Gate Charge vs. Gate-Source Voltage

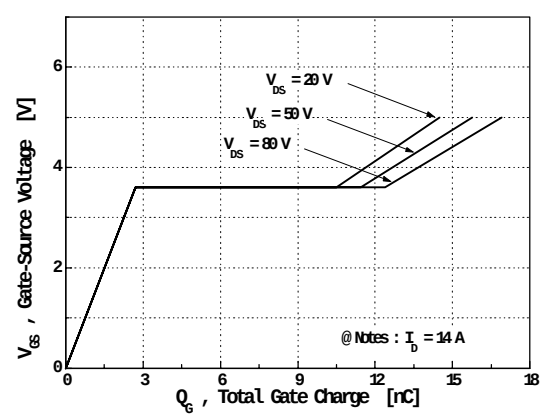


Fig 7. Breakdown Voltage vs. Temperature

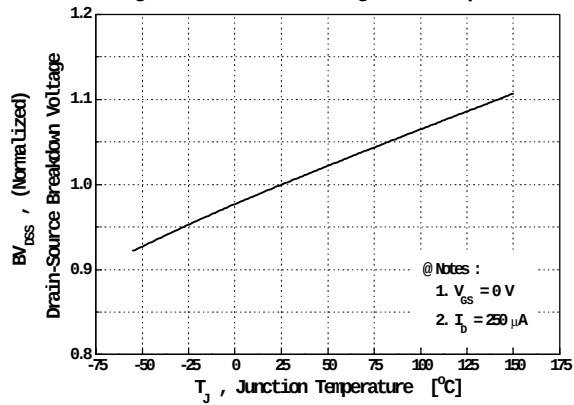


Fig 8. On-Resistance vs. Temperature

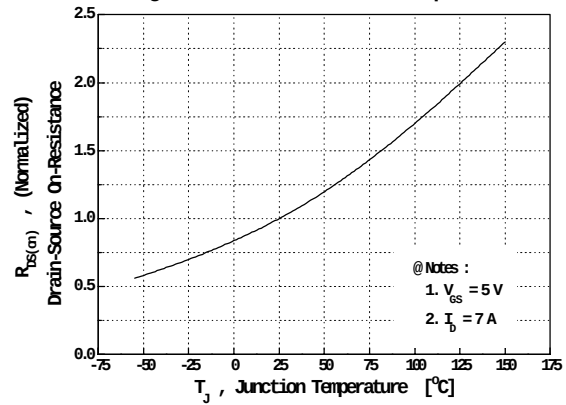


Fig 9. Max. Safe Operating Area

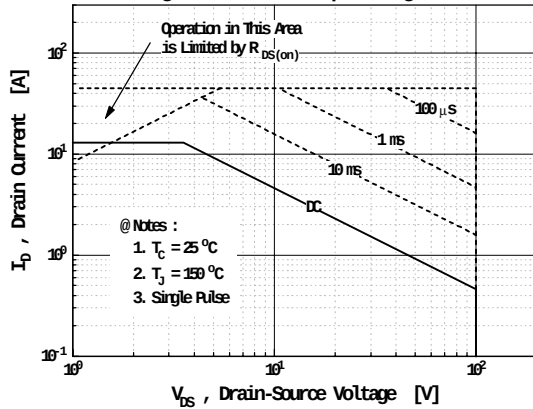


Fig 10. Max. Drain Current vs. Case Temperature

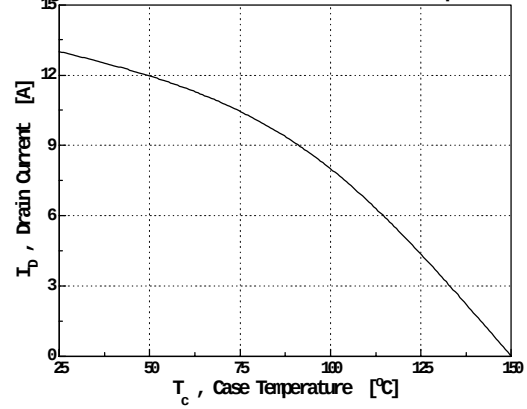


Fig 11. Thermal Response

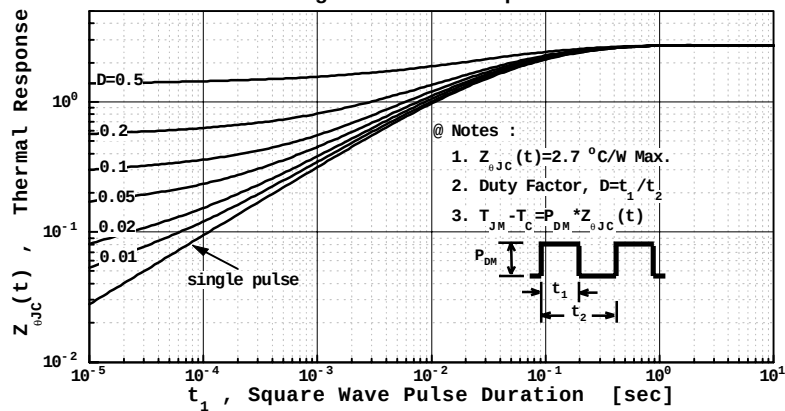


Fig 12. Gate Charge Test Circuit & Waveform

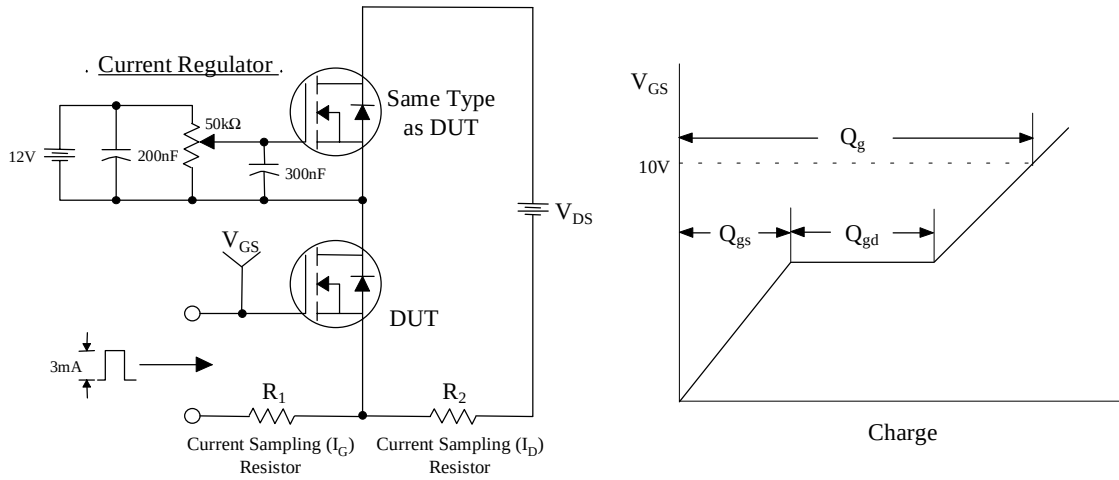


Fig 13. Resistive Switching Test Circuit & Waveforms

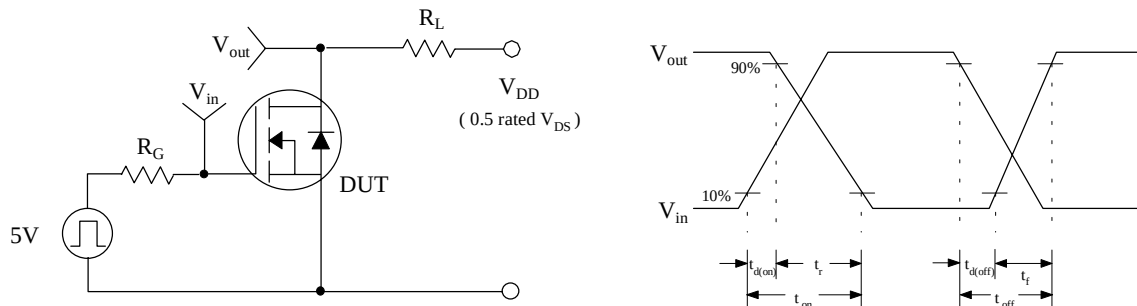
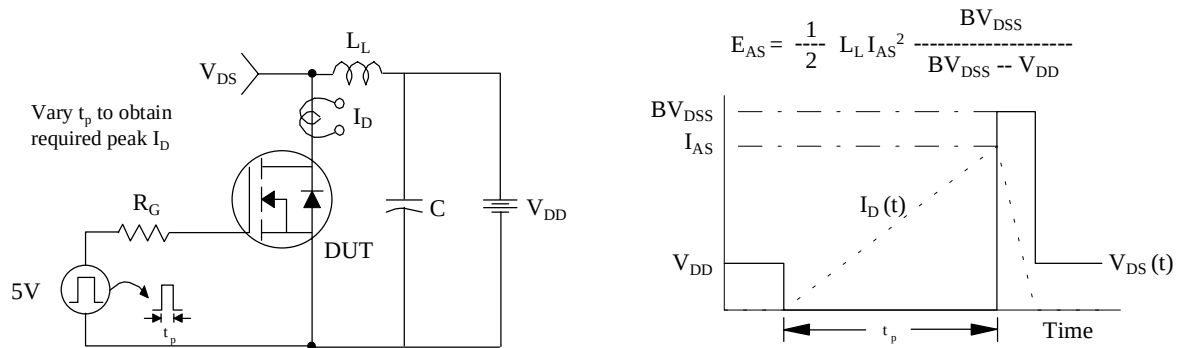


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms



DUT

V_{DS}

I_S

Driver

V_{GS}

R_G

Same Type as DUT

V_{DD}

L

dv/dt controlled by . R_G .

I_S controlled by Duty Factor . D .



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Technical drawing of a 10-pin D-sub connector. The drawing includes three views: a front view (top left), a side view (top right), and a rear view (bottom right). Dimensions are provided in millimeters (mm) with tolerances.

Front View Dimensions:

- Overall width: 6.60 ± 0.20
- Pin pitch (center-to-center): 2.30 TYP [2.30 ± 0.20]
- Pin width: 0.76 ± 0.10
- Pin height: 0.80 ± 0.20
- Shell height: 0.60 ± 0.20
- Shell width (excluding pins): 5.34 ± 0.30
- Shell width (including pins): 6.10 ± 0.20
- Overall height: 9.50 ± 0.30
- Internal width: 4.34
- Internal height: 2.70 ± 0.20
- Internal width (excluding pins): 0.50
- Internal height (excluding pins): 0.70 ± 0.20
- Internal width (including pins): 0.50
- Internal height (including pins): 0.70 ± 0.20

Side View Dimensions:

- Overall width: 2.30 ± 0.10
- Pin pitch (center-to-center): 2.30 ± 0.20
- Pin width: 0.76 ± 0.10
- Pin height: 0.80 ± 0.20
- Shell height: 0.60 ± 0.20
- Shell width (excluding pins): 5.34 ± 0.30
- Shell width (including pins): 6.10 ± 0.20
- Overall height: 9.50 ± 0.30
- Internal width: 4.34
- Internal height: 2.70 ± 0.20
- Internal width (excluding pins): 0.50
- Internal height (excluding pins): 0.70 ± 0.20
- Internal width (including pins): 0.50
- Internal height (including pins): 0.70 ± 0.20

Rear View Dimensions:

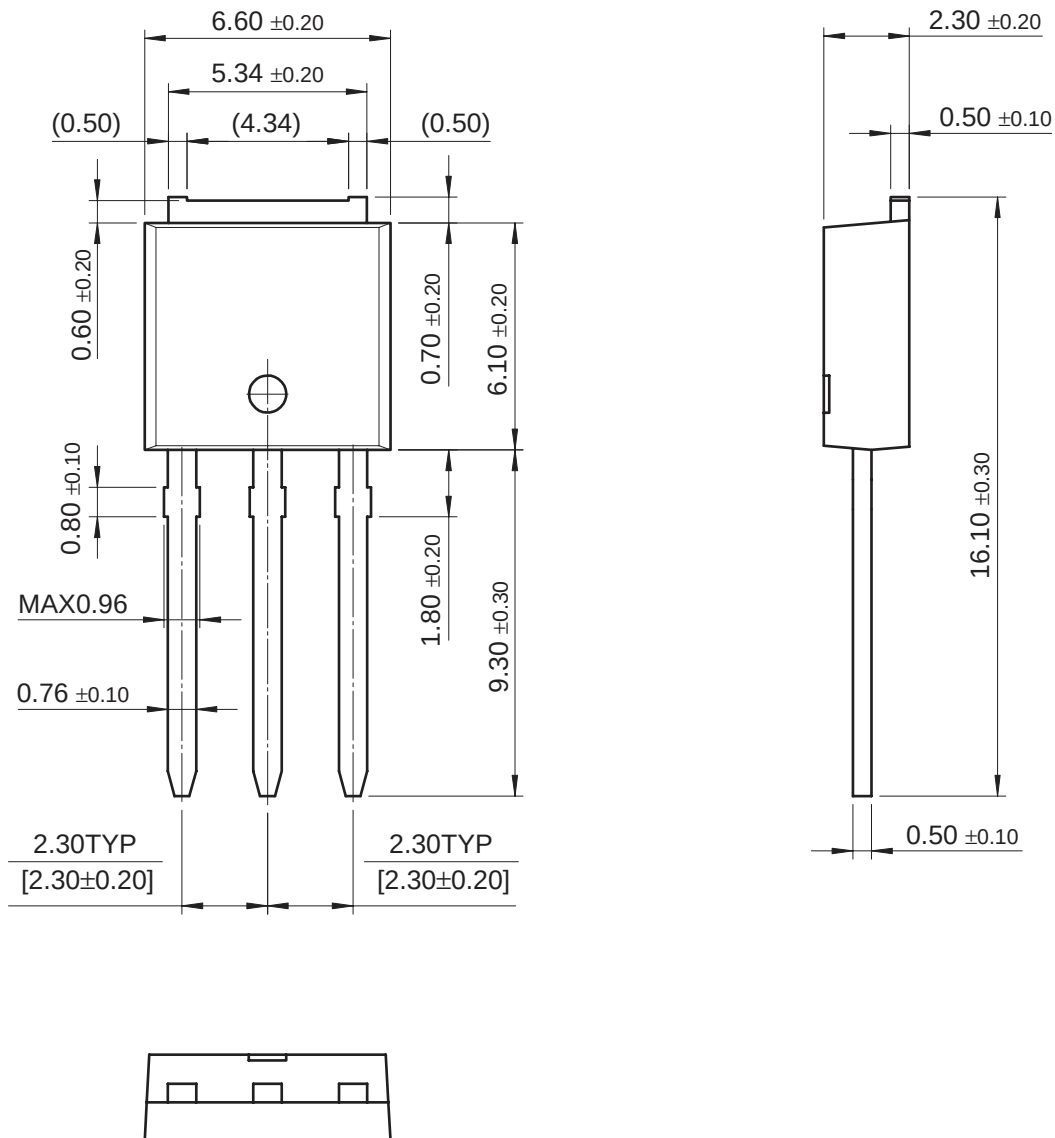
- Overall width: 6.60 ± 0.20
- Pin pitch (center-to-center): 2.30 TYP [2.30 ± 0.20]
- Pin width: 0.76 ± 0.10
- Pin height: 0.80 ± 0.20
- Shell height: 0.60 ± 0.20
- Shell width (excluding pins): 5.34 ± 0.30
- Shell width (including pins): 6.10 ± 0.20
- Overall height: 9.50 ± 0.30
- Internal width: 4.34
- Internal height: 2.70 ± 0.20
- Internal width (excluding pins): 0.50
- Internal height (excluding pins): 0.70 ± 0.20
- Internal width (including pins): 0.50
- Internal height (including pins): 0.70 ± 0.20

September 1999, Rev B

IPAK Package Dimensions



IPAK (FS PKG CODE AL)



Dimensions in Millimeters

September 1999, Rev B

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IRLR130A

100V N-Channel Logic Level A-FET

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Features

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
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- Lower Leakage Current: 10μA (Max.) @ VDS = 100V
- Lower R_{DS(ON)} : 0.101Ω (Typ.)

Datasheet

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Product status/pricing/packaging

Product	Product status	Pricing*	Package type	Leads	Packing method
IRLR130ATF	Full Production	\$0.497	TO-252(DPAK)	2	TAPE REEL
IRLR130ATM	Full Production	\$0.497	TO-252(DPAK)	2	TAPE REEL

* 1,000 piece Budgetary Pricing

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Models

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PSPICE				
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