



FQD1N60C / FQU1N60C

600V N-Channel MOSFET

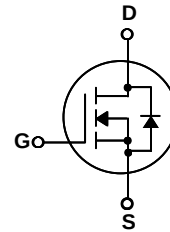
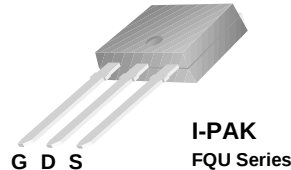
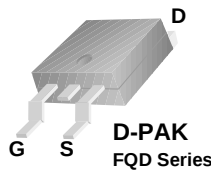
General Description

These N-Channel enhancement mode power field effect transistors are produced using Corise Semiconductor's proprietary, planar stripe, DMOS technology.

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switch mode power supply.

Features

- 1A, 600V, $R_{DS(on)} = 11.5\Omega$ @ $V_{GS} = 10V$
- Low gate charge (typical 4.8nC)
- Low C_{rss} (typical 3.5 pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Absolute Maximum Ratings

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	FQD1N60C / FQU1N60C	Units
V_{DSS}	Drain-Source Voltage	600	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$)	1	A
	- Continuous ($T_C = 100^\circ\text{C}$)	0.6	A
I_{DM}	Drain Current - Pulsed (Note 1)	4	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	33	mJ
I_{AR}	Avalanche Current (Note 1)	1	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	2.8	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Power Dissipation ($T_A = 25^\circ\text{C}$)*	2.5	W
	Power Dissipation ($T_C = 25^\circ\text{C}$)	28	W
	- Derate above 25°C	0.22	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	4.53	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient*	--	50	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	110	$^\circ\text{C/W}$

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	600	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, Referenced to 25°C	--	0.6	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 480\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.0	--	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$	--	9.3	11.5	Ω
g_{FS}	Forward Transconductance	$V_{DS} = 40\text{ V}, I_D = 0.5\text{ A}$ (Note 4)	--	0.75	--	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	130	170	pF
C_{oss}	Output Capacitance		--	19	25	pF
C_{rss}	Reverse Transfer Capacitance		--	3.5	4.5	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 300\text{ V}, I_D = 1.1\text{ A},$ $R_G = 25\text{ }\Omega$ (Note 4, 5)	--	7	24	ns
t_r	Turn-On Rise Time		--	21	52	ns
$t_{d(off)}$	Turn-Off Delay Time		--	13	36	ns
t_f	Turn-Off Fall Time		--	27	64	ns
Q_g	Total Gate Charge	$V_{DS} = 480\text{ V}, I_D = 1.1\text{ A},$ $V_{GS} = 10\text{ V}$ (Note 4, 5)	--	4.8	6.2	nC
Q_{gs}	Gate-Source Charge		--	0.7	--	nC
Q_{gd}	Gate-Drain Charge		--	2.7	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximum Continuous Drain-Source Diode Forward Current	--	--	1	A		
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	4	A		
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 0.5 A		--	--	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 1.1 A,		--	190	--	ns
Q _{rr}	Reverse Recovery Charge	dI _F / dt = 100 A/μs (Note 4)		--	0.53	--	μC

Notes:

1. Repetitive Rating ; Pulse width limited by maximum junction temperature
2. $L = 59\text{ mH}, I_{AS} = 1.1\text{ A}, V_{DD} = 50\text{ V}, R_G = 25\text{ }\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 1.1\text{ A}, dI/dt \leq 200\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

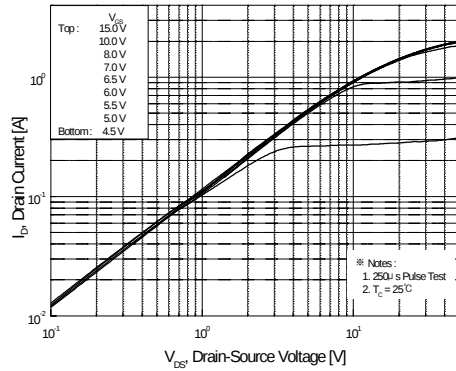


Figure 1. On-Region Characteristics

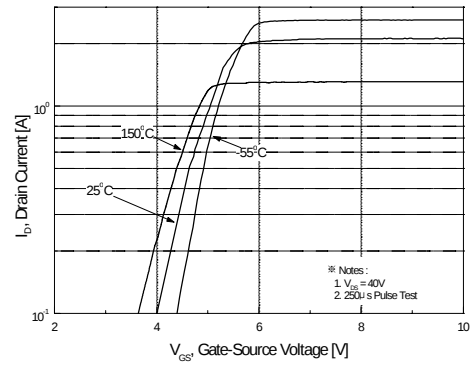


Figure 2. Transfer Characteristics

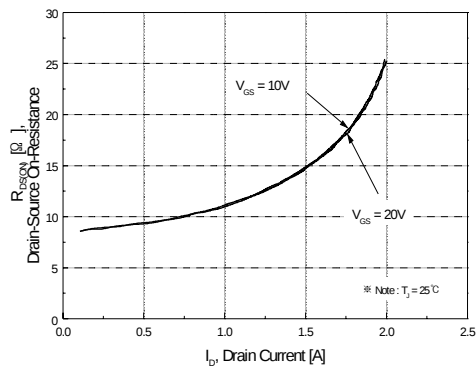


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

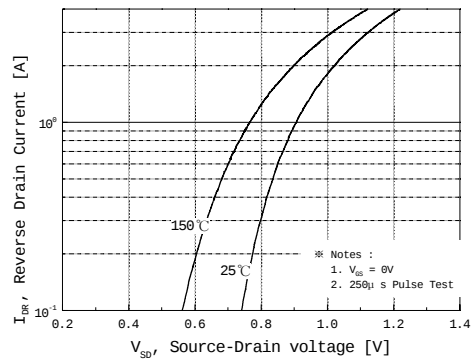


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

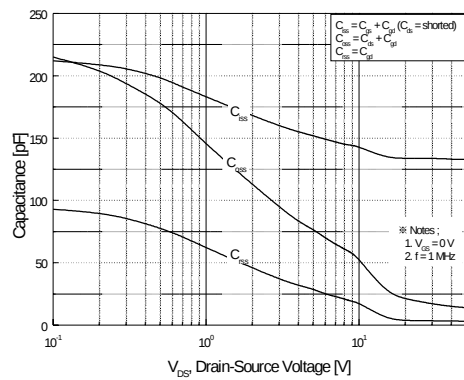


Figure 5. Capacitance Characteristics

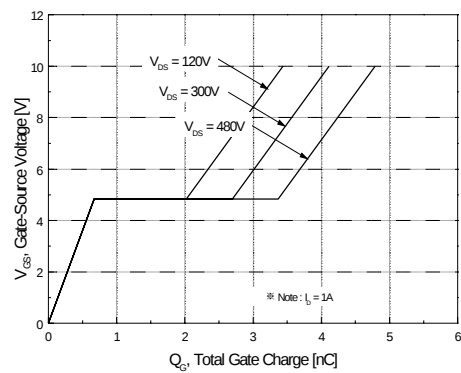


Figure 6. Gate Charge Characteristics

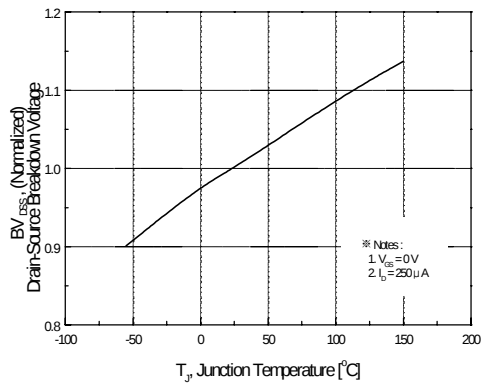


Figure 7. Breakdown Voltage Variation vs Temperature

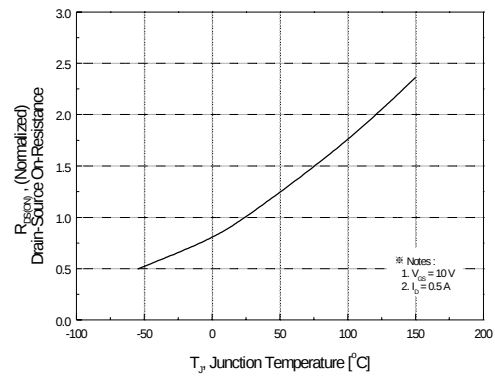


Figure 8. On-Resistance Variation vs Temperature

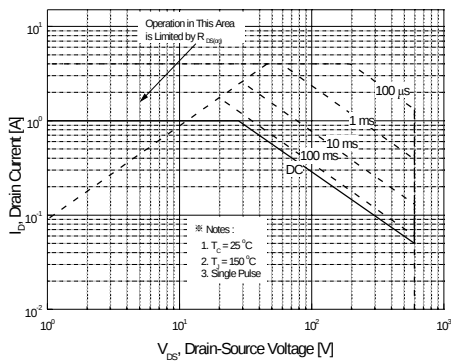


Figure 9. Maximum Safe Operating Area

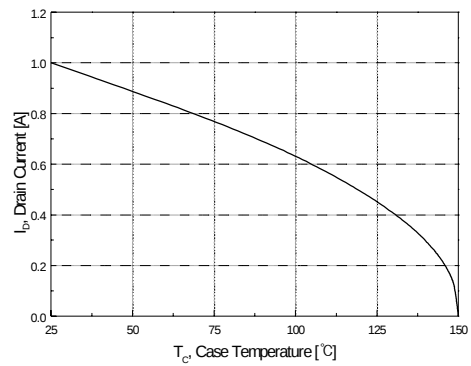


Figure 10. Maximum Drain Current vs Case Temperature

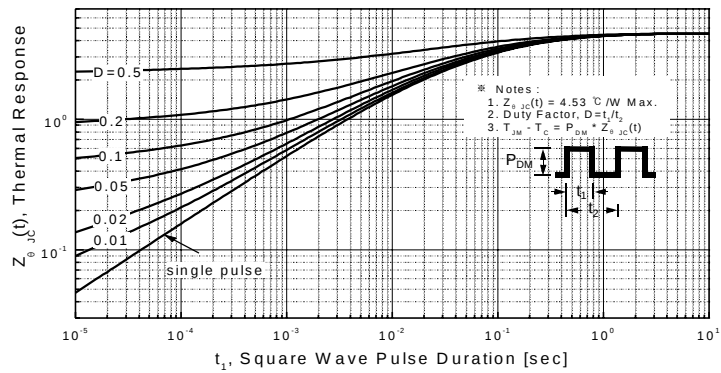
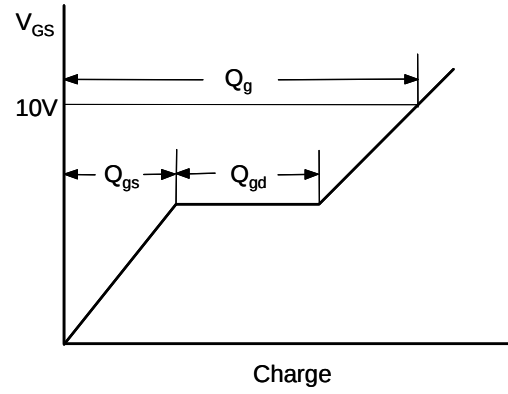
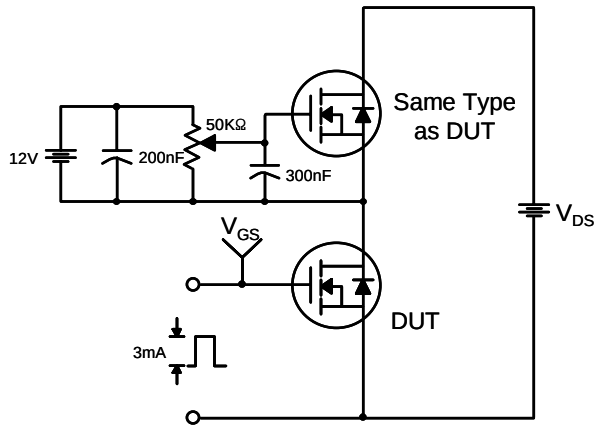
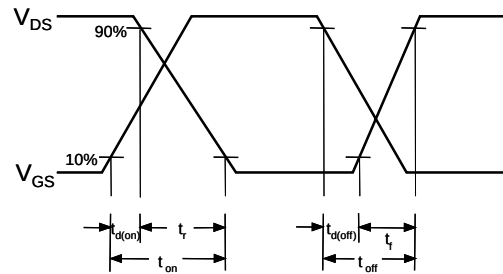
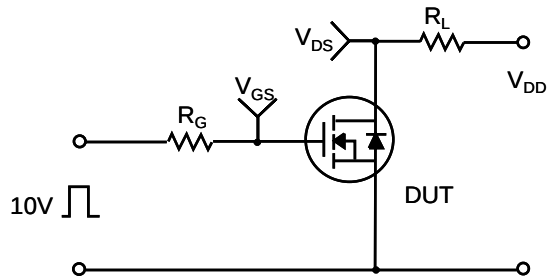


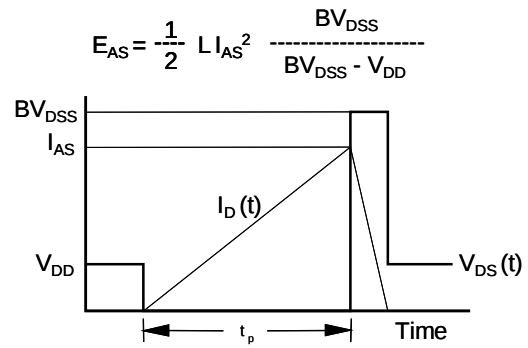
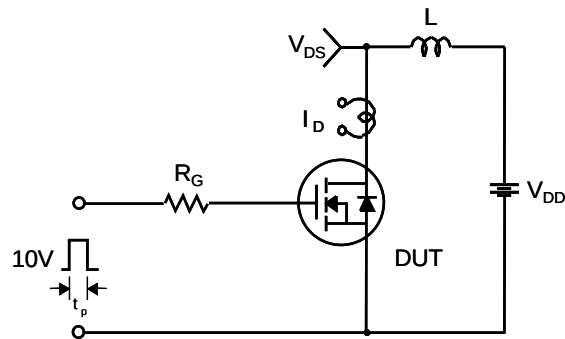
Figure 11. Transient Thermal Response Curve



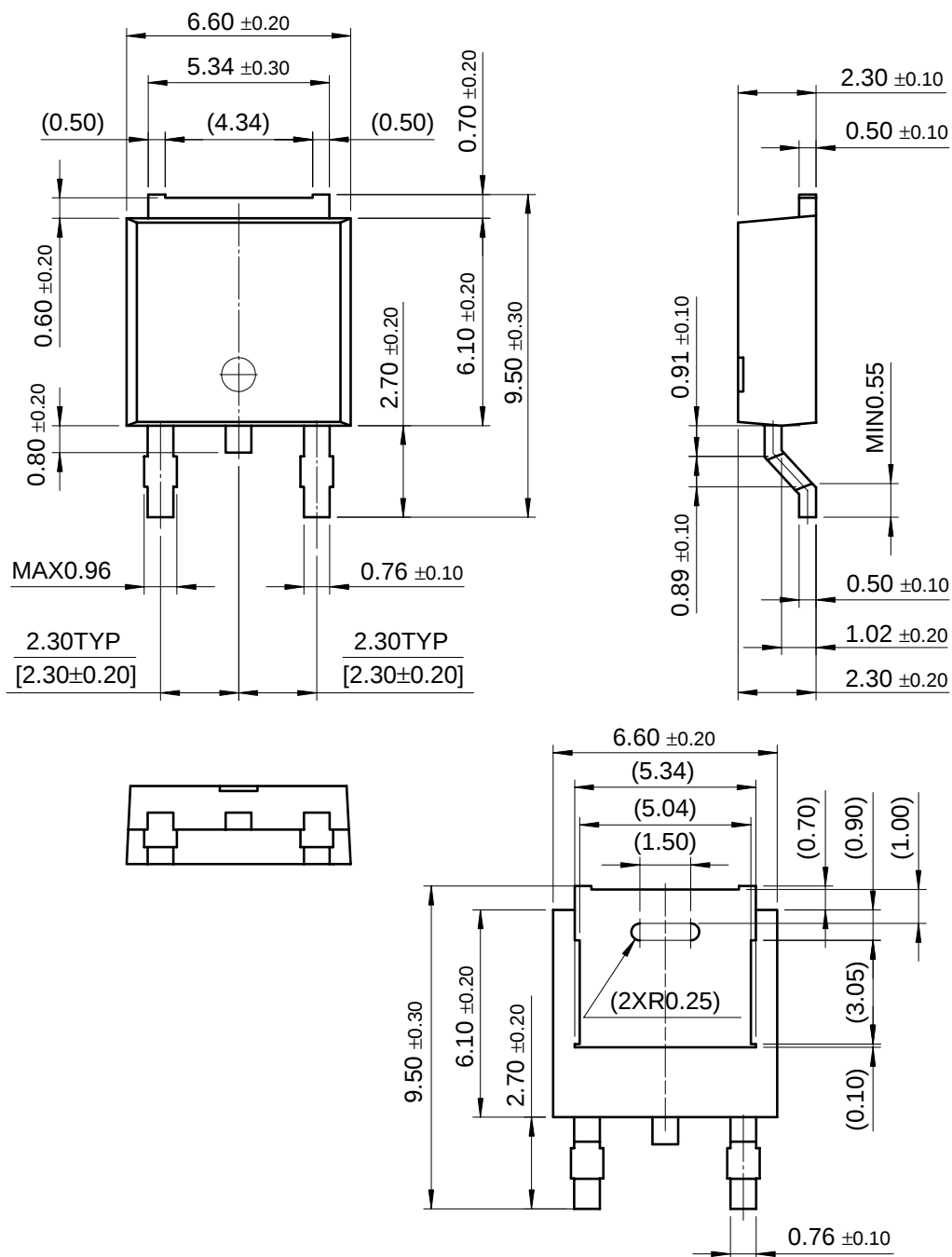
Resistive Switching Test Circuit & Waveforms



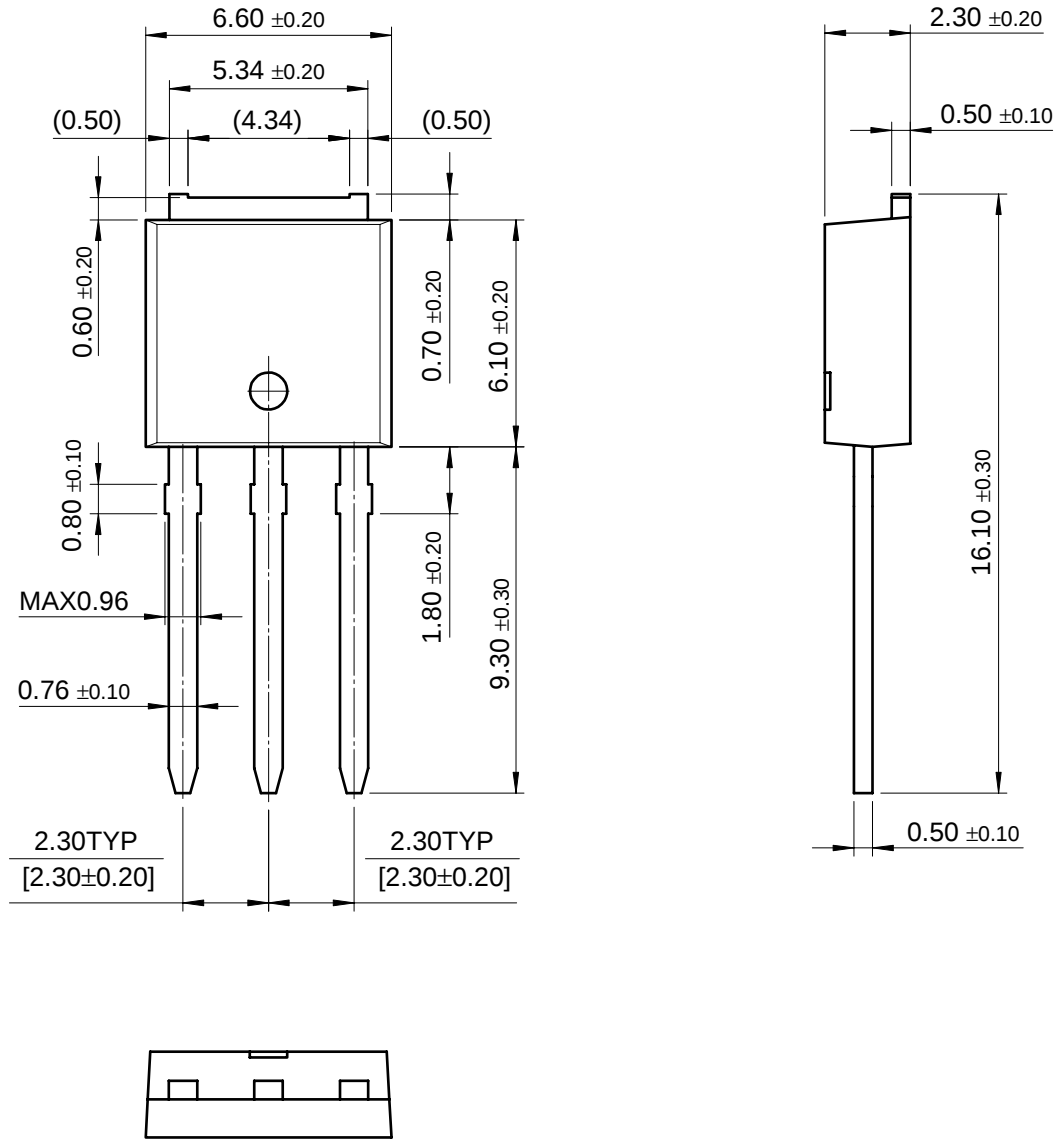
Unclamped Inductive Switching Test Circuit & Waveforms



D-PAK



I-PAK





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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