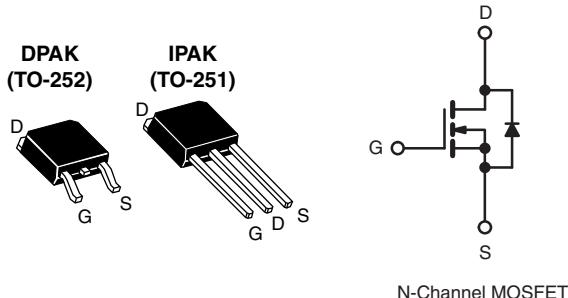


Power MOSFET

PRODUCT SUMMARY	
V _{DS} (V)	500
R _{DS(on)} (Ω)	V _{GS} = 10 V 1.7
Q _g (Max.) (nC)	24
Q _{gs} (nC)	6.5
Q _{gd} (nC)	13
Configuration	Single

FEATURES

- 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
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

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

ORDERING INFORMATION					
Package	DPAK (TO-252)	DPAK (TO-252)	DPAK (TO-252)	DPAK (TO-252)	IPAK (TO-251)
Lead (Pb)-free and Halogen-free	SiHFR430A-GE3	SiHFR430ATR-GE3 ^a	SiHFR430ATRL-GE3 ^a	SiHFR430ATRR-GE3 ^a	SiHFU430A-GE3
Lead (Pb)-free	IRFR430APbF	IRFR430ATRPbF ^a	IRFR430ATRLPbF ^a	IRFR430ATRRPbF ^a	IRFU430APbF
	SiHFR430A-E3	SiHFR430AT-E3 ^a	SiHFR430ATL-E3 ^a	SiHFR430ATR-E3 ^a	SiHFU430A-E3

Note

a. See device orientation.

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	I _D	5.0 3.2	A
Pulsed Drain Current ^a		I _{DM}	20	
Linear Derating Factor			0.91	W/°C
Single Pulse Avalanche Energy ^b		E _{AS}	130	mJ
Repetitive Avalanche Current ^a		I _{AR}	5.0	A
Repetitive Avalanche Energy ^a		E _{AR}	11	mJ
Maximum Power Dissipation	T _C = 25 °C	P _D	110	W
Peak Diode Recovery dV/dt ^c		dV/dt	3.0	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

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. Starting T_J = 25 °C, L = 11 mH, R_g = 25 Ω, I_{AS} = 5.0 A (see fig. 12).

c. I_{SD} ≤ 5.0 A, dI/dt ≤ 320 A/μs, V_{DD} ≤ V_{DS}, T_J ≤ 150 °C.

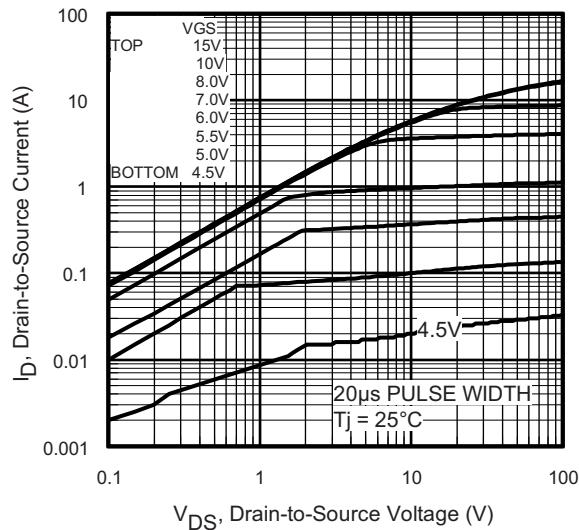
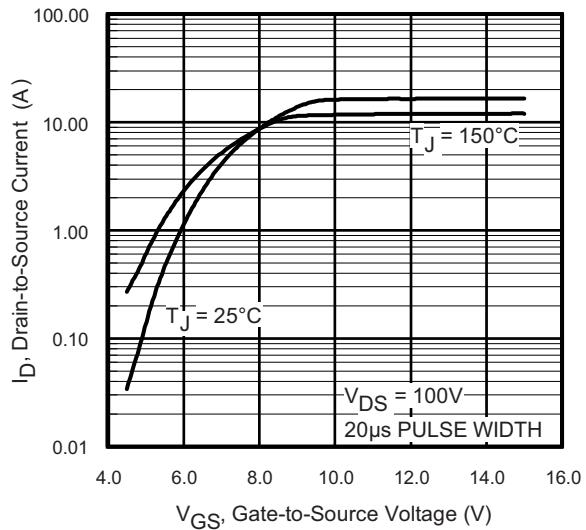
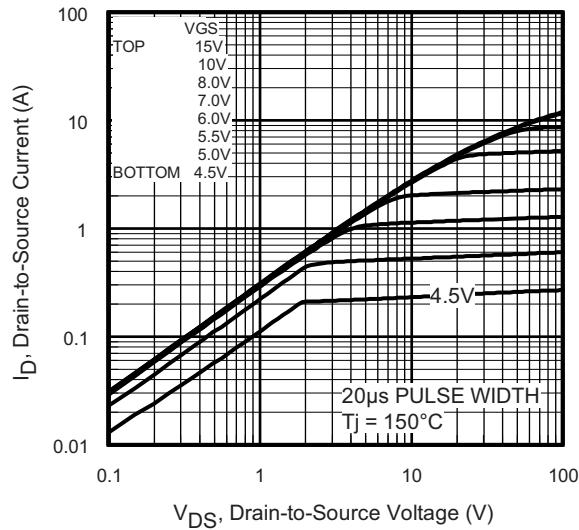
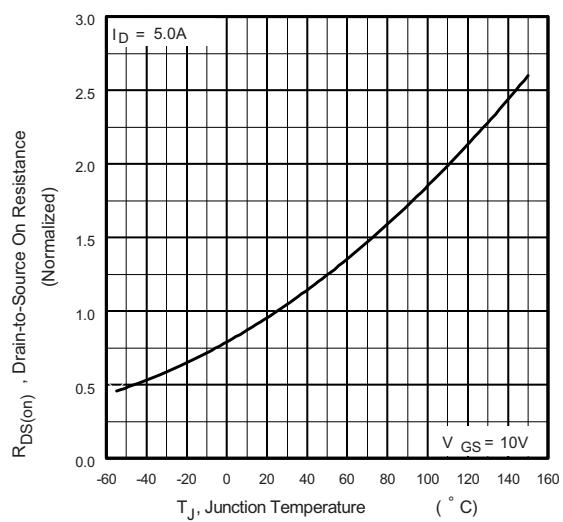
d. 1.6 mm from case.

THERMAL RESISTANCE RATINGS					
PARAMETER	SYMBOL	TYP.	MAX.	UNIT	
Maximum Junction-to-Ambient	R _{thJA}	-	62	°C/W	
Case-to-Sink, Flat, Greased Surface	R _{thCS}	0.50	-		
Maximum Junction-to-Case (Drain)	R _{thJC}	-	1.1		

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 V, I _D = 250 μA		500	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA		-	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 _{bss}	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 = 3.0 A ^b	-	-	1.7	Ω
Forward Transconductance	g _{fs}	V _{DS} = 50 V, I _D = 3.0 A		2.3	-	-	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1.0 MHz, see fig. 5		-	490	-	pF
Output Capacitance	C _{oss}			-	75	-	
Reverse Transfer Capacitance	C _{rss}			-	4.5	-	
Output Capacitance	C _{oss}	V _{GS} = 10 V	V _{DS} = 1.0 V, f = 1.0 MHz	-	750	-	pF
			V _{DS} = 400 V, f = 1.0 MHz	-	25	-	
Effective Output Capacitance	C _{oss eff.}		V _{DS} = 0 V to 400 V ^c	-	51	-	
Total Gate Charge	Q _g	V _{GS} = 10 V	I _D = 5.0 A, V _{DS} = 400 V, see fig. 6 and 13 ^b	-	-	24	nC
Gate-Source Charge	Q _{gs}			-	-	6.5	
Gate-Drain Charge	Q _{gd}			-	-	13	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 250 V, I _D = 5.0 A, R _g = 15 Ω, R _D = 50 Ω, see fig. 10 ^b		-	8.7	-	ns
Rise Time	t _r		-	27	-		
Turn-Off Delay Time	t _{d(off)}		-	17	-		
Fall Time	t _f		-	16	-		
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	5.0	A
Pulsed Diode Forward Current ^a	I _{SM}			-	-	20	
Body Diode Voltage	V _{SD}	T _J = 25 °C, I _S = 5.0 A, V _{GS} = 0 V ^b		-	-	1.5	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = 5.0 A, dI/dt = 100 A/μs ^b		-	410	620	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	1.4	2.1	μC
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}.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Fig. 1 - Typical Output Characteristics

Fig. 3 - Typical Transfer Characteristics

Fig. 2 - Typical Output Characteristics

Fig. 4 - Normalized On-Resistance vs. Temperature

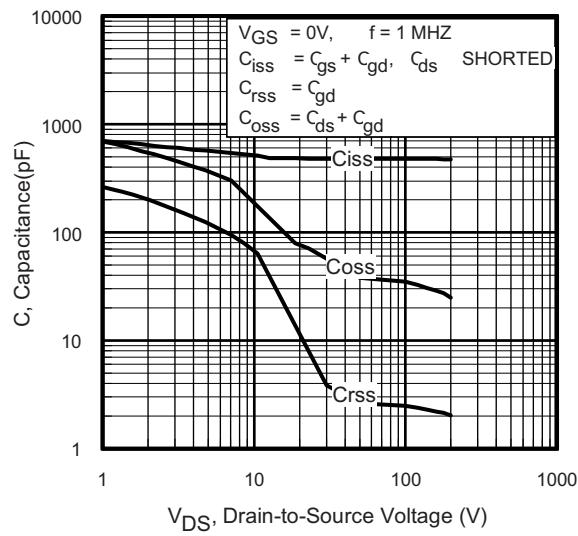


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

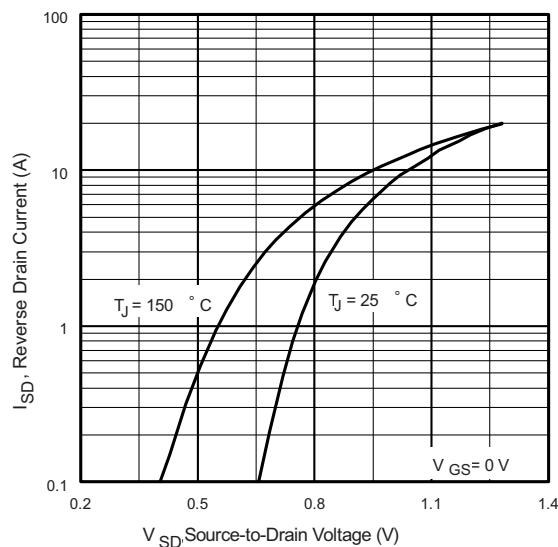


Fig. 7 - Typical Source-Drain Diode Forward Voltage

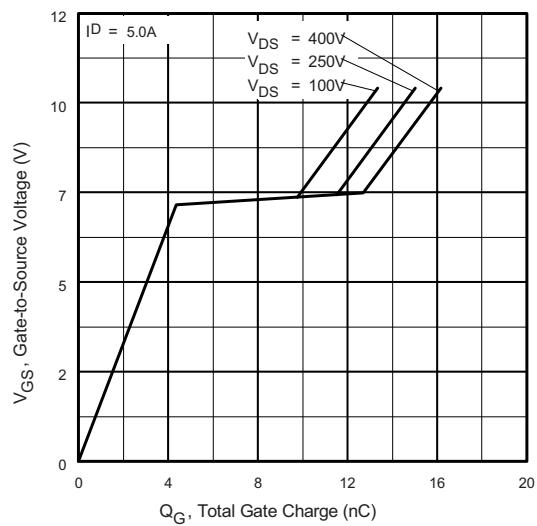


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

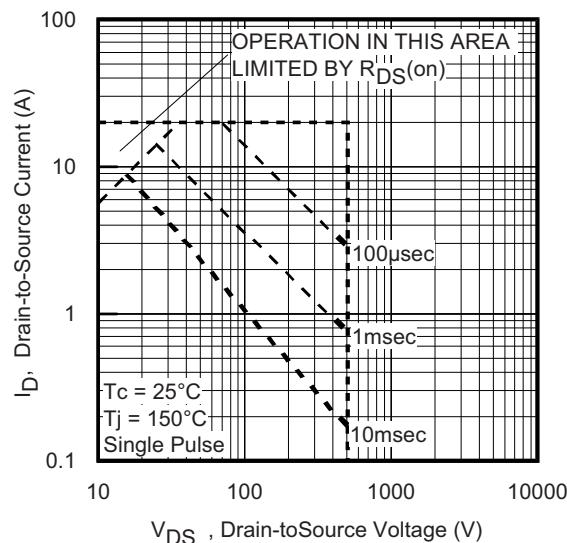


Fig. 8 - Maximum Safe Operating Area

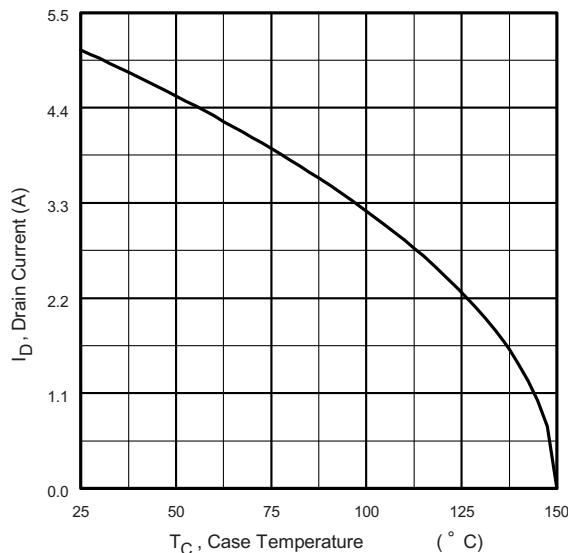


Fig. 9 - Maximum Drain Current vs. Case Temperature

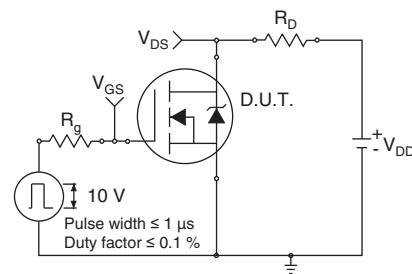


Fig. 10a - Switching Time Test Circuit

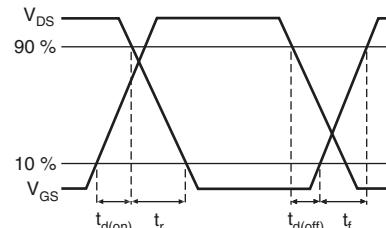


Fig. 10b - Switching Time Waveforms

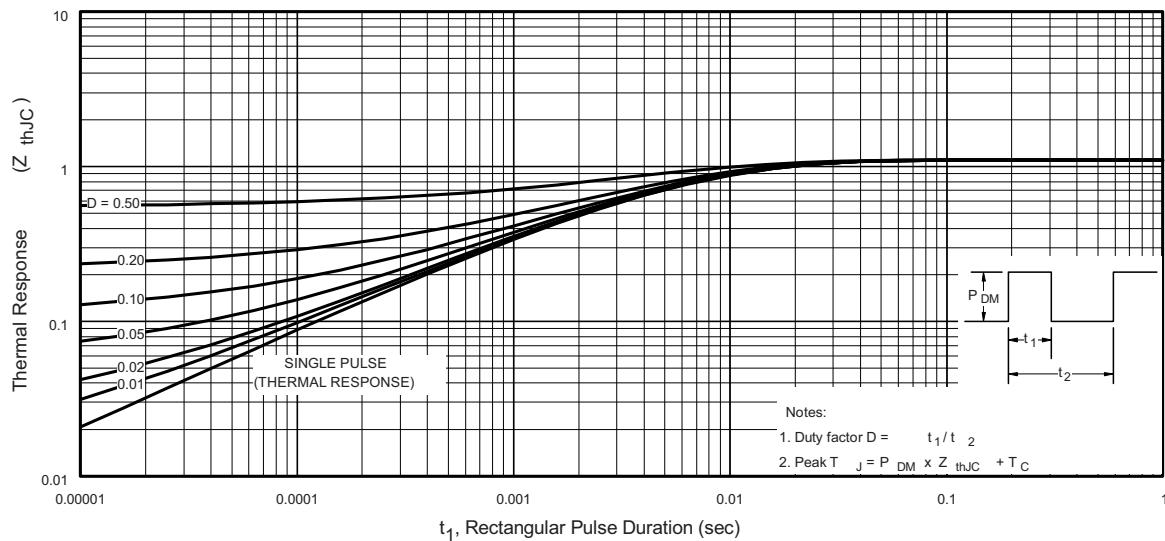


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

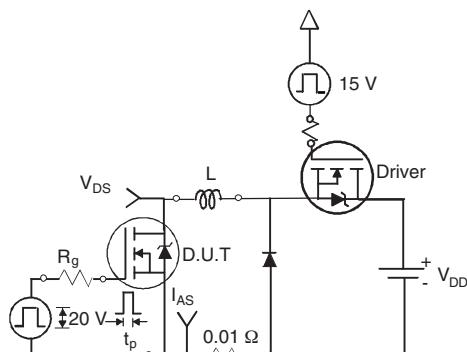


Fig. 12a - Unclamped Inductive Test Circuit

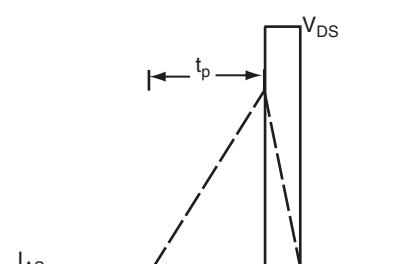
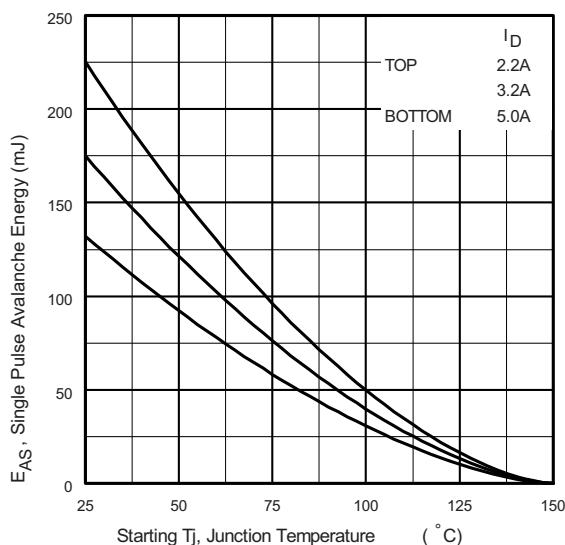
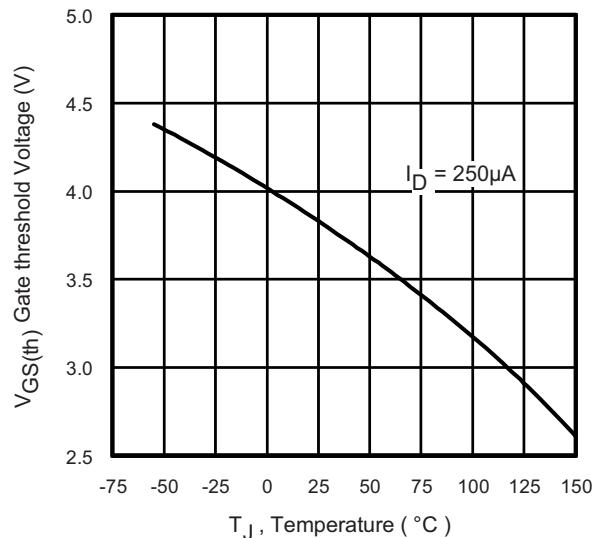
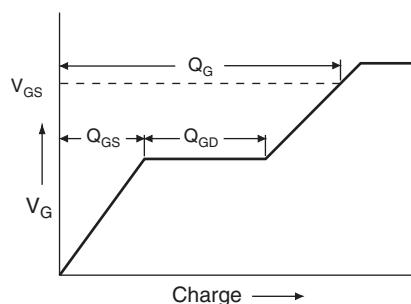
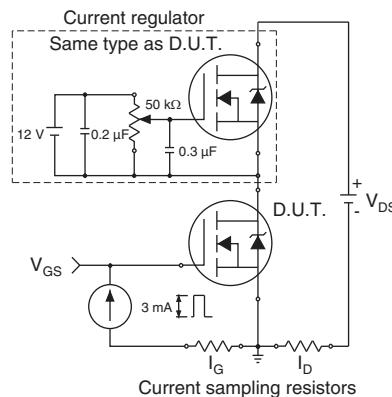
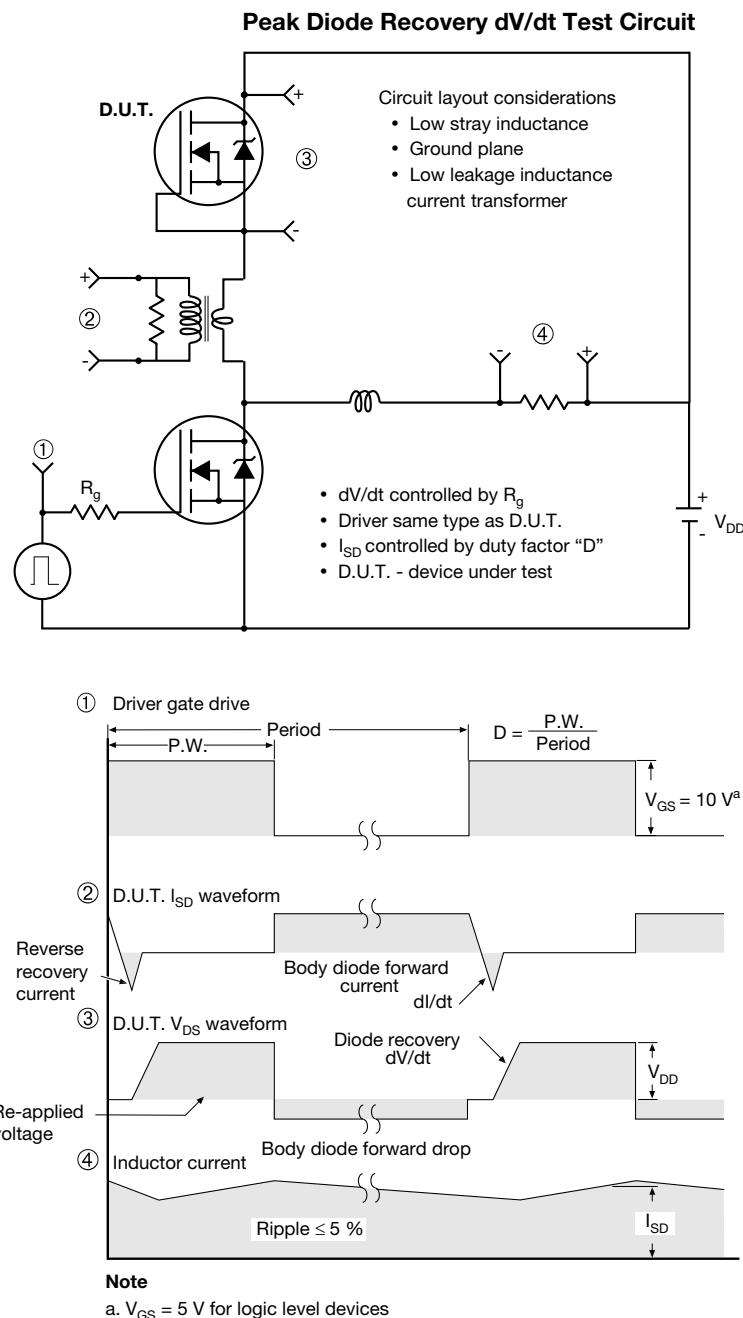


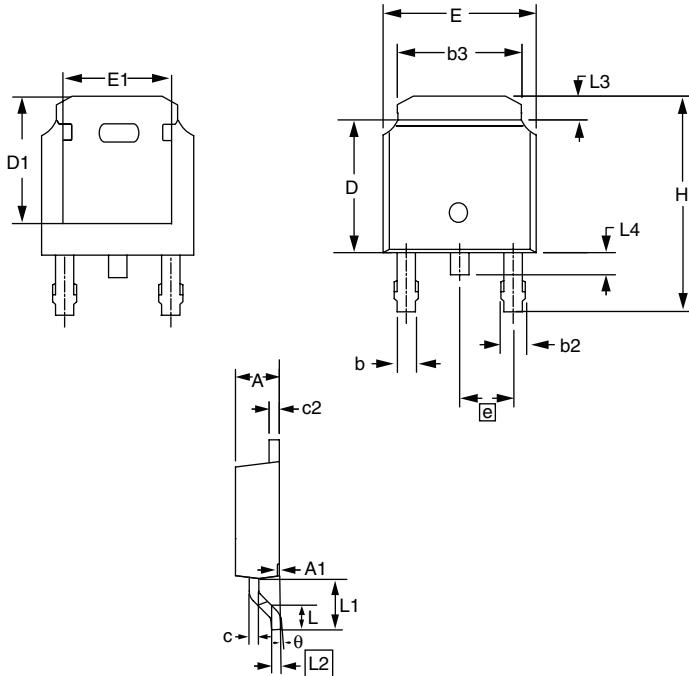
Fig. 12b - Unclamped Inductive Waveforms


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

Fig. 12d - Threshold Voltage vs. Temperature

Fig. 13a - Basic Gate Charge Waveform

Fig. 13b - Gate Charge Test Circuit


Fig. 14 - For N-Channel

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TO-252AA (HIGH VOLTAGE)



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
E	6.40	6.73	0.252	0.265
L	1.40	1.77	0.055	0.070
L1	2.743 REF		0.108 REF	
L2	0.508 BSC		0.020 BSC	
L3	0.89	1.27	0.035	0.050
L4	0.64	1.01	0.025	0.040
D	6.00	6.22	0.236	0.245
H	9.40	10.40	0.370	0.409
b	0.64	0.88	0.025	0.035
b2	0.77	1.14	0.030	0.045
b3	5.21	5.46	0.205	0.215
e	2.286 BSC		0.090 BSC	
A	2.20	2.38	0.087	0.094
A1	0.00	0.13	0.000	0.005
c	0.45	0.60	0.018	0.024
c2	0.45	0.58	0.018	0.023
D1	5.30	-	0.209	-
E1	4.40	-	0.173	-
θ	0'	10'	0'	10'

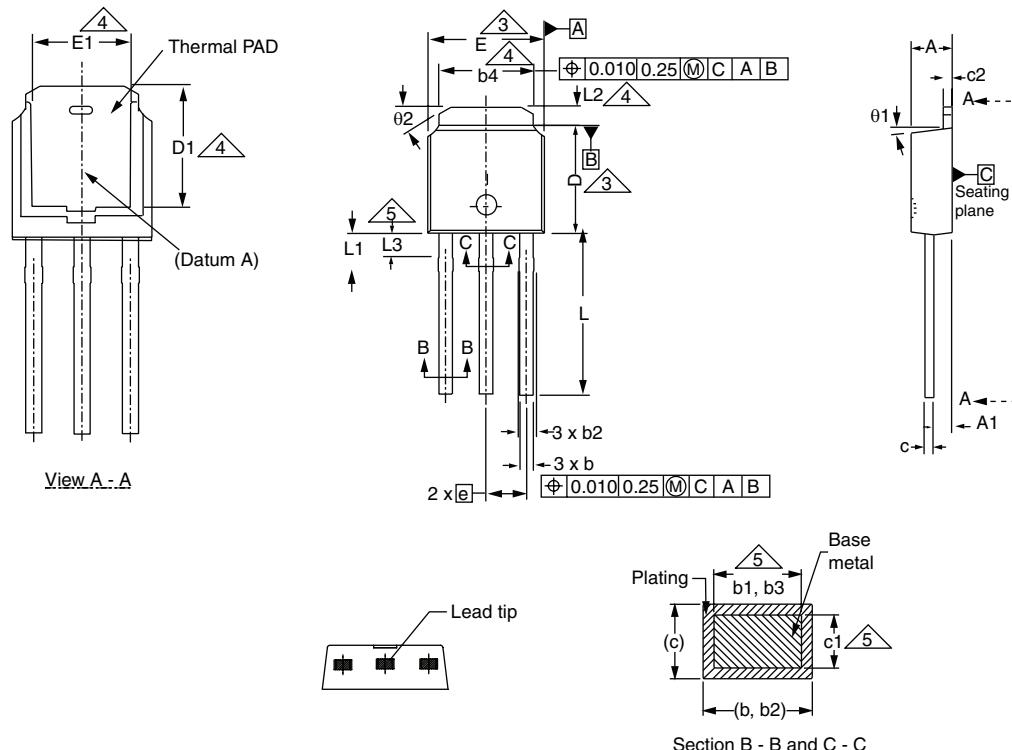
ECN: S-81965-Rev. A, 15-Sep-08

DWG: 5973

Notes

1. Package body sizes exclude mold flash, protrusion or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 0.10 mm per side.
2. Package body sizes determined at the outermost extremes of the plastic body exclusive of mold flash, gate burrs and interlead flash, but including any mismatch between the top and bottom of the plastic body.
3. The package top may be smaller than the package bottom.
4. Dimension "b" does not include dambar protrusion. Allowable dambar protrusion shall be 0.10 mm total in excess of "b" dimension at maximum material condition. The dambar cannot be located on the lower radius of the foot.

TO-251AA (HIGH VOLTAGE)



	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	0.89	1.14	0.035	0.045
b	0.64	0.89	0.025	0.035
b1	0.65	0.79	0.026	0.031
b2	0.76	1.14	0.030	0.045
b3	0.76	1.04	0.030	0.041
b4	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c1	0.41	0.56	0.016	0.022
c2	0.46	0.86	0.018	0.034
D	5.97	6.22	0.235	0.245

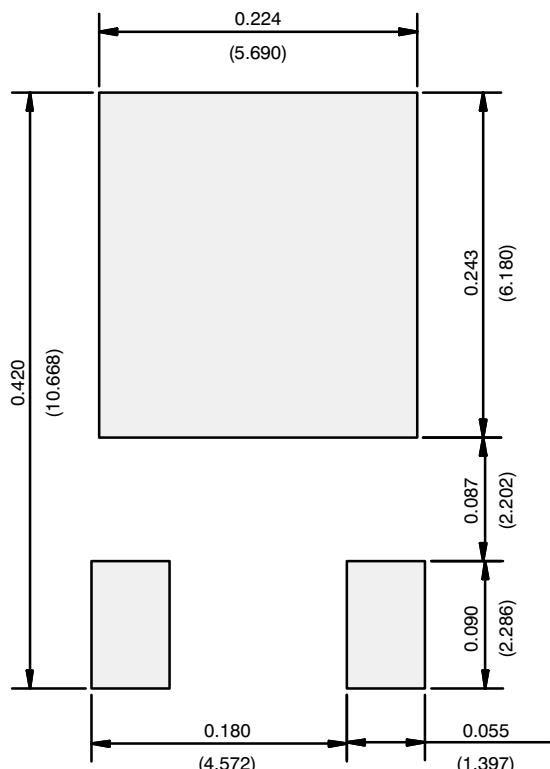
ECN: S-82111-Rev. A, 15-Sep-08

DWG: 5968

	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
e	2.29 BSC		2.29 BSC	
L	8.89	9.65	0.350	0.380
L1	1.91	2.29	0.075	0.090
L2	0.89	1.27	0.035	0.050
L3	1.14	1.52	0.045	0.060
01	0'	15'	0'	15'
02	25'	35'	25'	35'

Notes

- Dimensioning and tolerancing per ASME Y14.5M-1994.
- Dimension are shown in inches and millimeters.
- Dimension D and E do not include mold flash. Mold flash shall not exceed 0.13 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body.
- Thermal pad contour optional with dimensions b4, L2, E1 and D1.
- Lead dimension uncontrolled in L3.
- Dimension b1, b3 and c1 apply to base metal only.
- Outline conforms to JEDEC outline TO-251AA.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)

Recommended Minimum Pads
Dimensions in Inches/(mm)

[Return to Index](#)



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Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

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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, помошь 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 помошь 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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