

ISL9V3040D3STV

ECOSPARK® Ignition IGBT

300 mJ, 400 V, N-Channel Ignition IGBT

Features

- SCIS Energy = 300 mJ at $T_J = 25^\circ\text{C}$
- Logic Level Gate Drive
- This Device is Pb-Free and is RoHS Compliant
- AEC-Q101 Qualified and PPAP Capable

Applications

- Automotive Ignition Coil Driver Circuits
- High Current Ignition System
- Coil on Plug Applications

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ Unless Otherwise Stated)

Parameter	Symbol	Value	Units
Collector to Emitter Breakdown Voltage ($I_C = 1\text{ mA}$)	BV_{CER}	400	V
Emitter to Collector Voltage – Reverse Battery Condition ($I_C = 10\text{ mA}$)	BV_{ECS}	24	V
ISCIS = 14.2 A, L = 3.0 mHz, $R_{GE} = 1\text{ K}\Omega$ (Note 1), $T_C = 25^\circ\text{C}$	E_{SCIS25}	300	mJ
ISCIS = 10.6 A, L = 3.0 mHz, $R_{GE} = 1\text{ K}\Omega$ (Note 2), $T_C = 150^\circ\text{C}$	$E_{SCIS150}$	170	mJ
Collector Current Continuous, at $V_{GE} = 4.0\text{ V}$, $T_C = 25^\circ\text{C}$	IC_{25}	21	A
Collector Current Continuous, at $V_{GE} = 4.0\text{ V}$, $T_C = 110^\circ\text{C}$	IC_{110}	17	A
Gate to Emitter Voltage Continuous	V_{GEM}	± 10	V
Power Dissipation Total, $T_C = 25^\circ\text{C}$	PD	150	W
Power Dissipation Derating, $T_C > 25^\circ\text{C}$	PD	1	W/ $^\circ\text{C}$
Operating Junction and Storage Temperature	T_J, T_{STG}	-55 to 175	$^\circ\text{C}$
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T_L	300	$^\circ\text{C}$
Reflow soldering according to JESD020C	T_{PKG}	260	$^\circ\text{C}$
HBM-Electrostatic Discharge Voltage at 100 pF, 1500 Ω	ESD	4	kV
CDM-Electrostatic Discharge Voltage at 1 Ω	ESD	2	kV

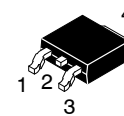
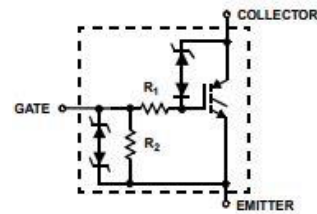
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Self Clamped inductive Switching Energy (E_{SCIS25}) of 300 mJ is based on the test conditions that is starting $T_J = 25^\circ\text{C}$, L = 3 mHz, ISCIS = 14.2 A, $V_{CC} = 100\text{ V}$ during inductor charging and $V_{CC} = 0\text{ V}$ during time in clamp.
2. Self Clamped inductive Switching Energy ($E_{SCIS150}$) of 170 mJ is based on the test conditions that is starting $T_J = 150^\circ\text{C}$, L = 3 mHz, ISCIS = 10.6 A, $V_{CC} = 100\text{ V}$ during inductor charging and $V_{CC} = 0\text{ V}$ during time in clamp.



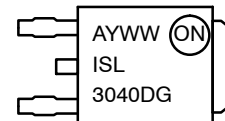
ON Semiconductor®

www.onsemi.com



DPAK (SINGLE GAUGE)
CASE 369C

MARKING DIAGRAM



ISL3040DG = Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

ISL9V3040D3STV

THERMAL RESISTANCE RATINGS

Characteristic	Symbol	Max	Units
Junction-to-Case – Steady State (Drain) (Notes 1, 3 and 4)	$R_{\theta JC}$	1	°C/W

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
-----------	--------	----------------	-----	-----	-----	------

OFF CHARACTERISTICS

Collector to Emitter Breakdown Voltage	BV_{CER}	$I_{CE} = 2\text{ mA}$, $V_{GE} = 0\text{ V}$, $R_{GE} = 1\text{ K}\Omega$, $T_J = -40\text{ to }150^\circ\text{C}$		370	400	430	V
Collector to Emitter Breakdown Voltage	BV_{CES}	$I_{CE} = 10\text{ mA}$, $V_{GE} = 0\text{ V}$, $R_{GE} = 0$, $T_J = -40\text{ to }150^\circ\text{C}$		390	420	450	V
Emitter to Collector Breakdown Voltage	BV_{ECS}	$I_{CE} = -75\text{ mA}$, $V_{GE} = 0\text{ V}$, $T_J = 25^\circ\text{C}$		30	–	–	V
Gate to Emitter Breakdown Voltage	BV_{GES}	$I_{GES} = \pm 2\text{ mA}$		± 12	± 14	–	V
Collector to Emitter Leakage Current	I_{CER}	$V_{CE} = 175\text{ V}$, $R_{GE} = 1\text{ K}\Omega$	$T_J = 25^\circ\text{C}$	–	–	25	μA
			$T_J = 150^\circ\text{C}$	–	–	1	mA
Emitter to Collector Leakage Current	I_{ECS}	$V_{EC} = 24\text{ V}$	$T_J = 25^\circ\text{C}$	–	–	1	mA
			$T_J = 150^\circ\text{C}$	–	–	40	
Series Gate Resistance	R_1			–	70	–	Ω
Gate to Emitter Resistance	R_2			10 K	–	26 K	Ω

ON CHARACTERISTICS

Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_{CE} = 6\text{ A}$, $V_{GE} = 4\text{ V}$, $T_J = 25^\circ\text{C}$	–	1.25	1.65	V
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_{CE} = 10\text{ A}$, $V_{GE} = 4.5\text{ V}$, $T_J = 150^\circ\text{C}$	–	1.58	1.80	V
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_{CE} = 15\text{ A}$, $V_{GE} = 4.5\text{ V}$, $T_J = 150^\circ\text{C}$	–	1.90	2.20	V

DYNAMIC CHARACTERISTICS

Gate Charge	$Q_{G(ON)}$	$I_{CE} = 10\text{ A}$, $V_{CE} = 12\text{ V}$, $V_{GE} = 5\text{ V}$	–	17	–	nC	
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_{CE} = 1\text{ mA}$, $V_{CE} = V_{GE}$	$T_J = 25^{\circ}\text{C}$	1.3	–	2.2	V
			$T_J = 150^{\circ}\text{C}$	0.75	–	1.8	
Gate to Emitter Plateau Voltage	V_{GEP}	$V_{CE} = 12\text{ V}$, $I_{CE} = 10\text{ A}$	–	3.0	–	V	

SWITCHING CHARACTERISTICS

Current Turn-On Delay Time–Resistive	$t_{d(ON)R}$	$V_{CE} = 14\text{ V}$, $R_L = 1\text{ }\Omega$, $V_{GE} = 5\text{ V}$, $R_G = 470\text{ }\Omega$, $T_J = 25^\circ\text{C}$	–	0.7	4	μs
Current Rise Time–Resistive	t_{rR}		–	2.1	7	
Current Turn-Off Delay Time–Inductive	$t_{d(OFF)L}$	$V_{CE} = 300\text{ V}$, $L = 1\text{ mH}$, $V_{GE} = 5\text{ V}$, $R_G = 470\text{ }\Omega$, $I_{CE} = 6.5\text{ A}$, $T_J = 25^\circ\text{C}$	–	4.8	15	
Current Fall Time–Inductive	t_{fL}		–	2.8	15	

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Package	Reel Diameter	Tape Width	Qty
ISL9V3040G1	ISL9V3040D3STV	DPAK (Pb-Free)	330 mm	16 mm	2500

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

TYPICAL CHARACTERISTICS

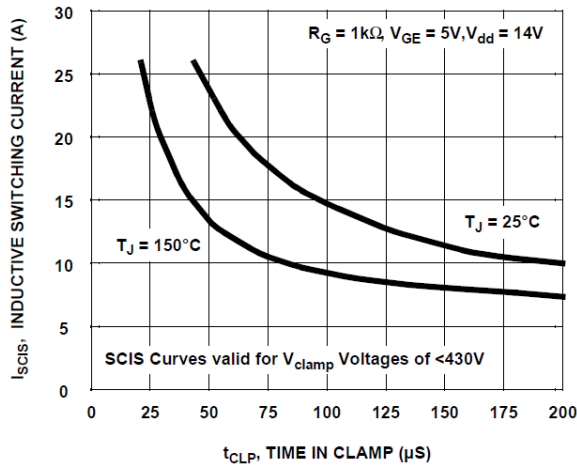


Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp

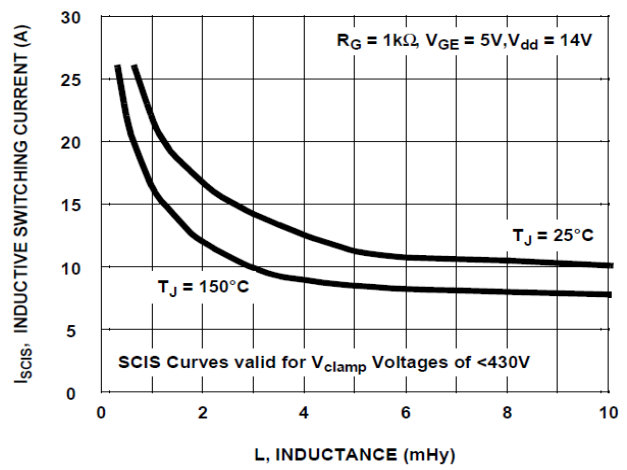


Figure 2. Self Clamped Inductive Switching Current vs. Inductance

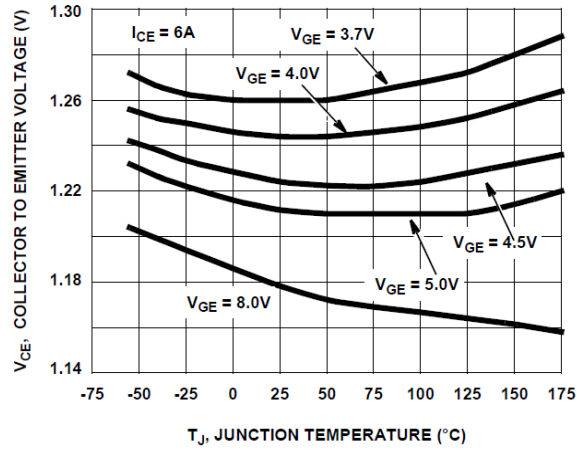


Figure 3. Collector to Emitter On-State Voltage vs. Junction Temperature

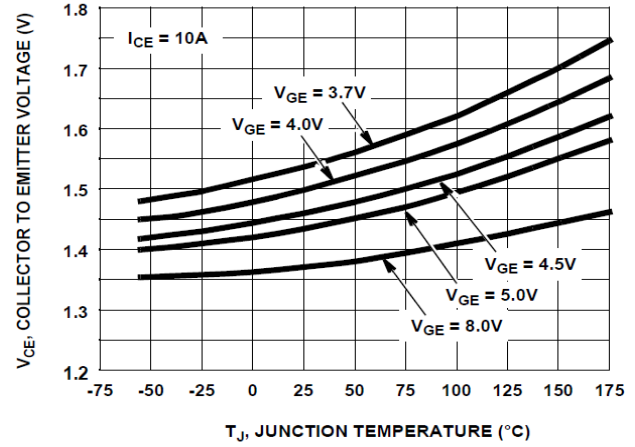


Figure 4. Collector to Emitter On-State Voltage vs. Junction Temperature

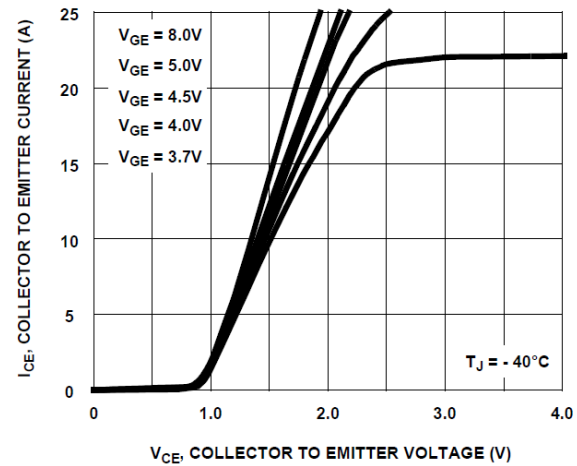


Figure 5. Collector to Emitter On-State Voltage vs. Collector Current

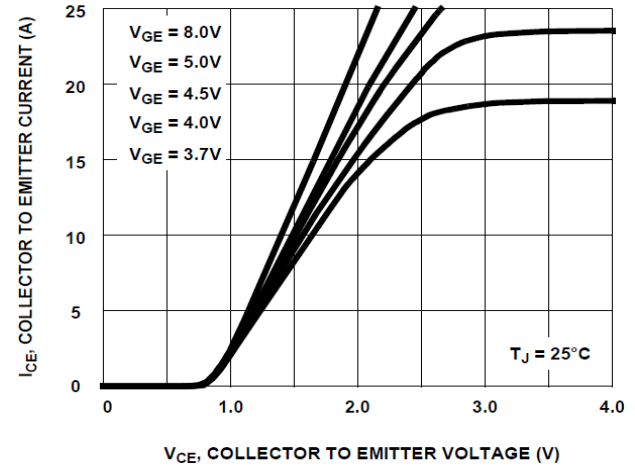


Figure 6. Collector to Emitter On- State Voltage vs. Collector Current

TYPICAL CHARACTERISTICS (continued)

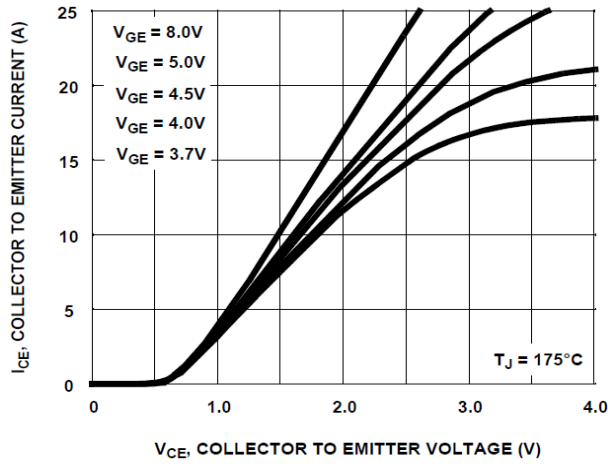


Figure 7. Collector to Emitter On-State Voltage vs. Collector Current

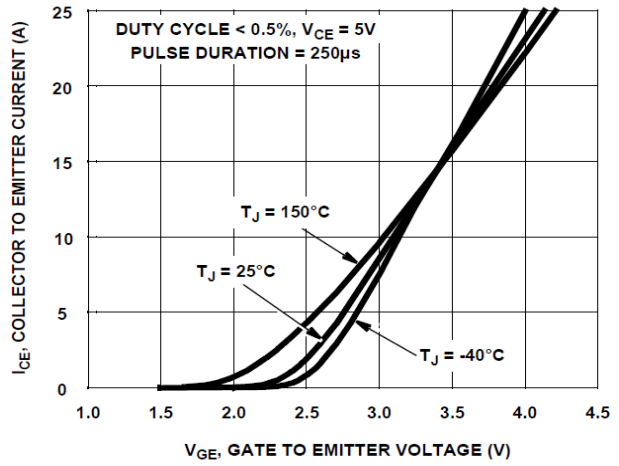


Figure 8. Transfer Characteristics

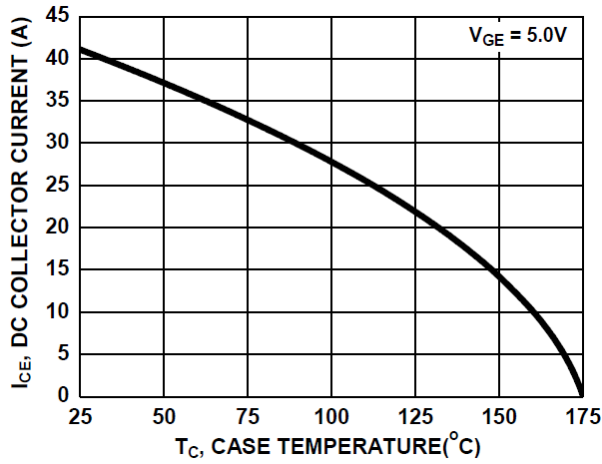


Figure 9. DC Collector Current vs. Case Temperature

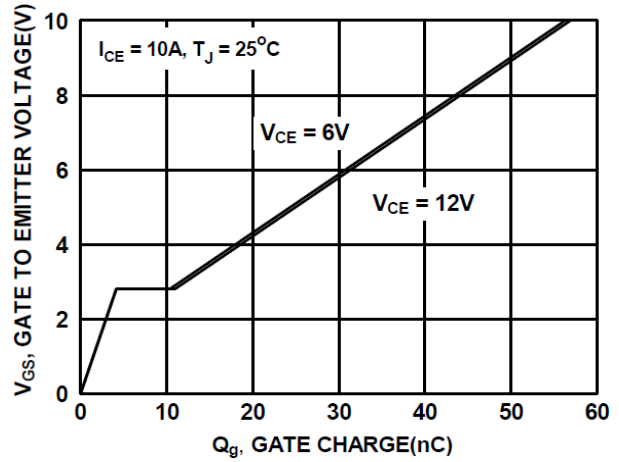


Figure 10. Gate Charge

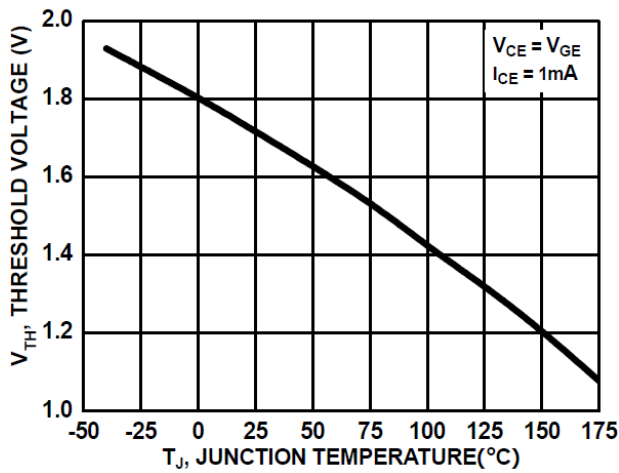


Figure 11. Threshold Voltage vs. Junction Temperature

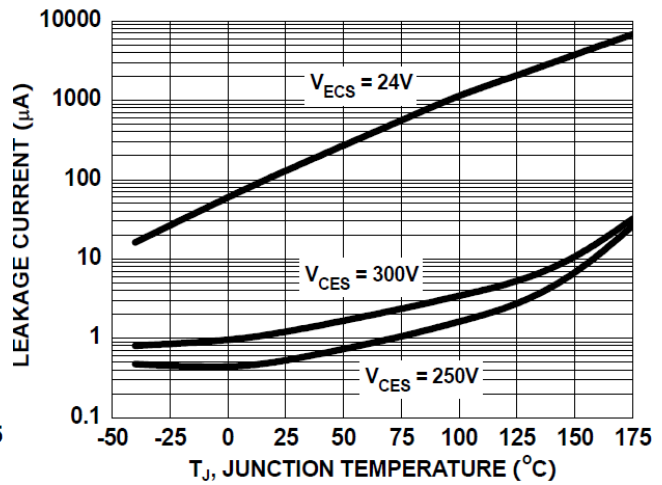
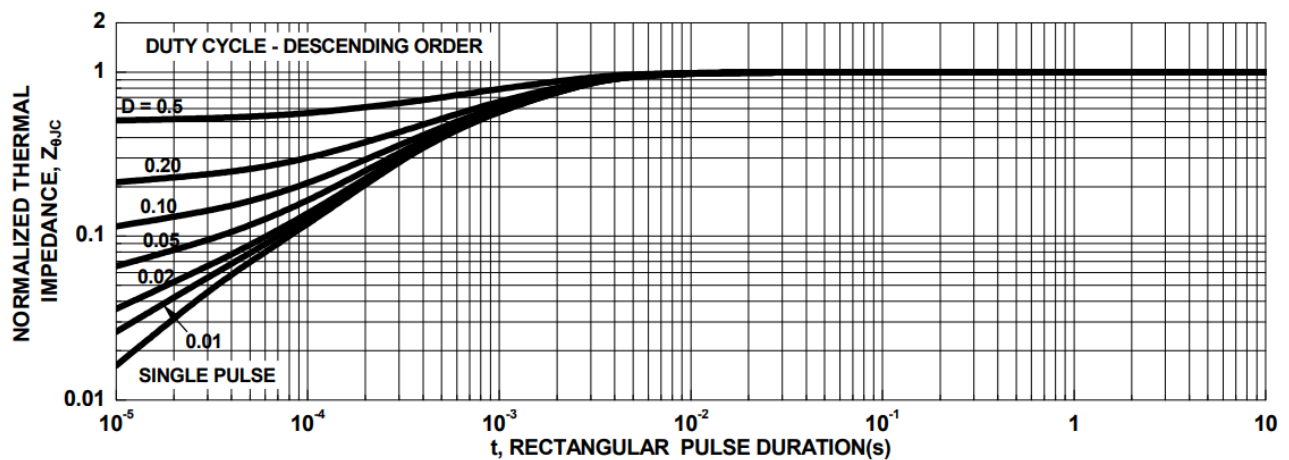
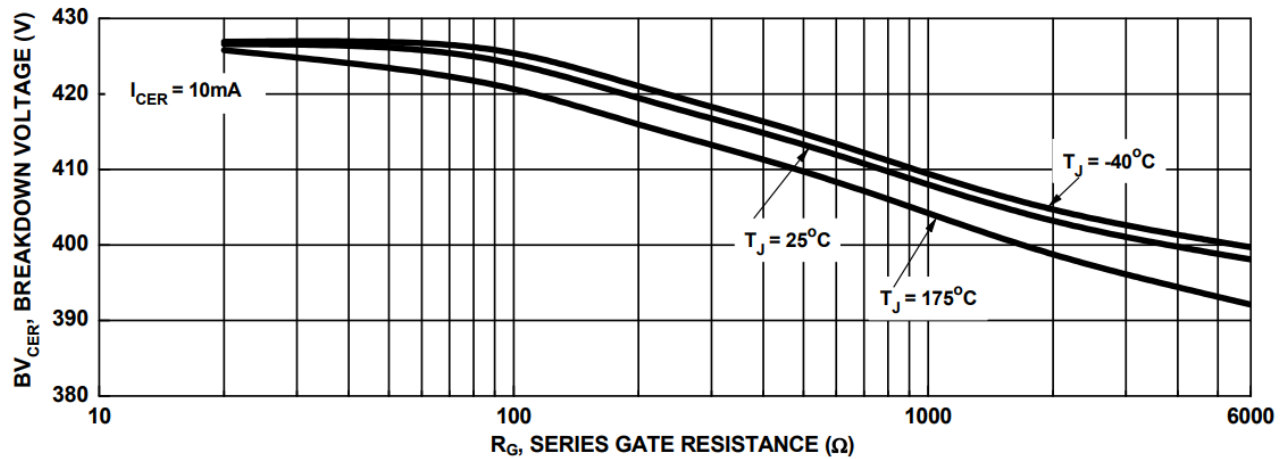
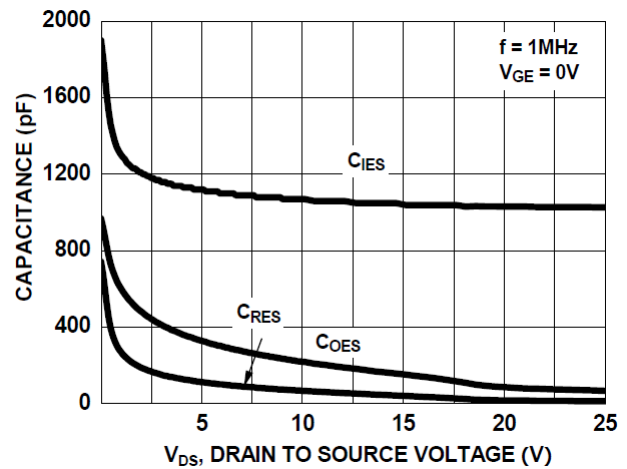
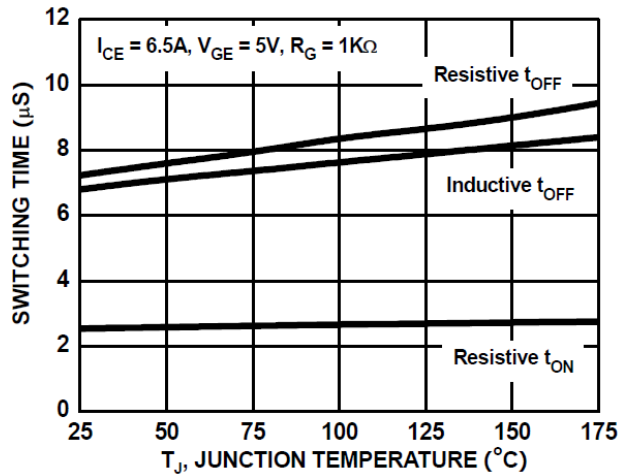


Figure 12. Leakage Current vs. Junction Temperature

ISL9V3040D3STV

TYPICAL CHARACTERISTICS (continued)



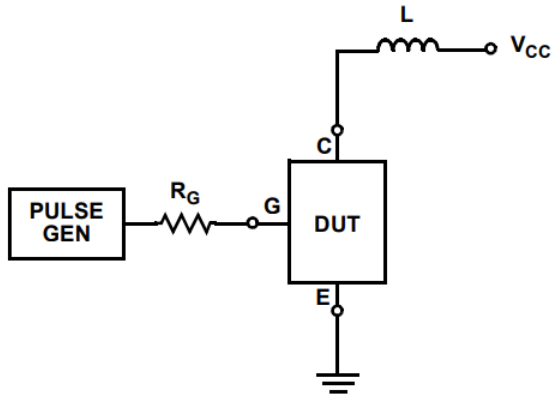


Figure 17. Inductive Switching Test Circuit

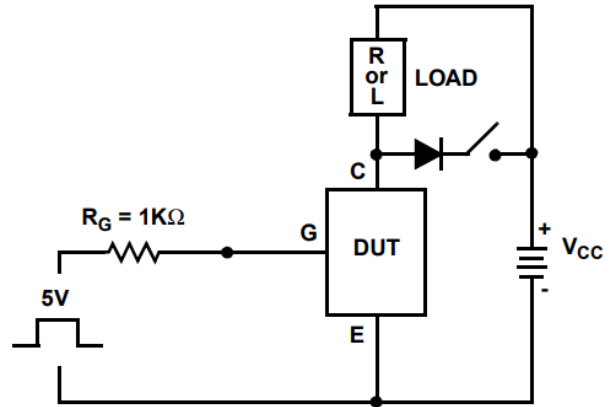


Figure 18. t_{ON} and t_{OFF} Switching Test Circuit

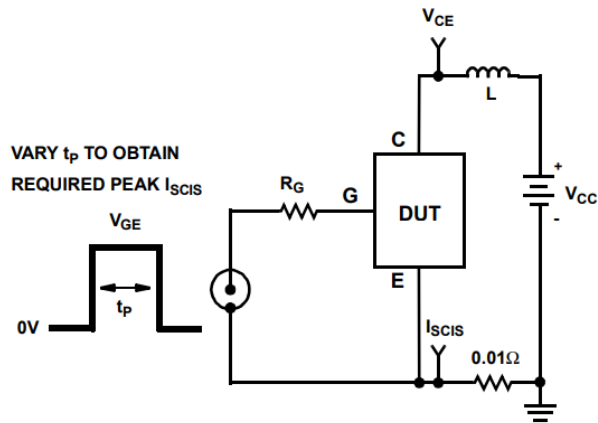


Figure 19. Energy Test Circuit

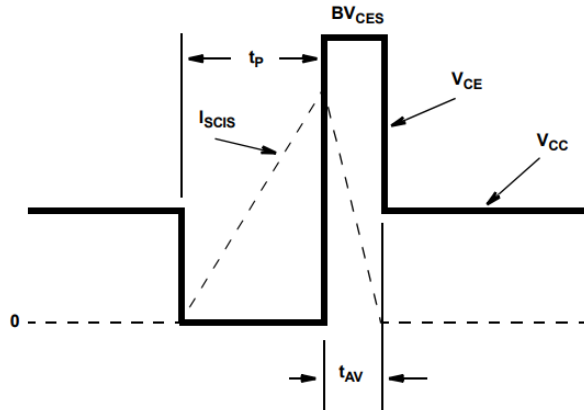


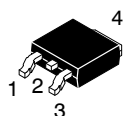
Figure 20. Energy Waveforms

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®

ON



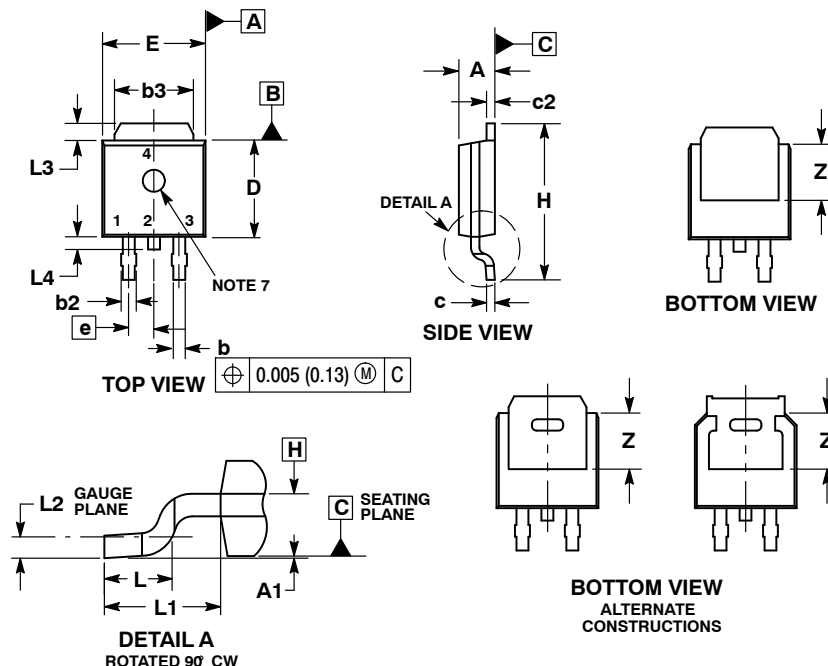
SCALE 1:1

DPAK (SINGLE GAUGE)

CASE 369C

ISSUE F

DATE 21 JUL 2015

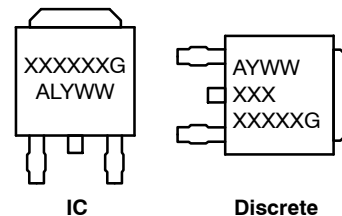


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.

DIM	MIN	MAX	MIN	MAX
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.028	0.045	0.72	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090	BSC	2.29	BSC
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L1	0.114	REF	2.90	REF
L2	0.020	BSC	0.51	BSC
L3	0.035	0.050	0.89	1.27
L4	---	0.040	---	1.01
Z	0.155	---	3.93	---

GENERIC MARKING DIAGRAM*

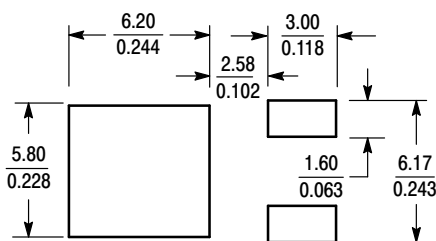


XXXXXX = Device Code
 A = Assembly Location
 L = Wafer Lot
 Y = Year
 WW = Work Week
 G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking.

- STYLE 1:**
 PIN 1. BASE
 2. COLLECTOR
 3. EMITTER
 4. COLLECTOR
- STYLE 2:**
 PIN 1. GATE
 2. DRAIN
 3. SOURCE
 4. DRAIN
- STYLE 3:**
 PIN 1. ANODE
 2. CATHODE
 3. ANODE
 4. CATHODE
- STYLE 4:**
 PIN 1. CATHODE
 2. ANODE
 3. GATE
 4. ANODE
- STYLE 5:**
 PIN 1. GATE
 2. ANODE
 3. CATHODE
 4. ANODE
- STYLE 6:**
 PIN 1. MT1
 2. MT2
 3. GATE
 4. MT2
- STYLE 7:**
 PIN 1. GATE
 2. COLLECTOR
 3. EMITTER
 4. COLLECTOR
- STYLE 8:**
 PIN 1. N/C
 2. CATHODE
 3. ANODE
 4. CATHODE
- STYLE 9:**
 PIN 1. ANODE
 2. CATHODE
 3. RESISTOR ADJUST
 4. CATHODE
- STYLE 10:**
 PIN 1. CATHODE
 2. ANODE
 3. CATHODE
 4. ANODE

SOLDERING FOOTPRINT*



SCALE 3:1 (mm inches)

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

DOCUMENT NUMBER:	98AON10527D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	DPAK (SINGLE GAUGE)	PAGE 1 OF 1

ON Semiconductor and ON are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local
Sales Representative



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

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.