



ISL9V3040D3S

Insulated Gate Bipolar Transistor

300mJ, 400V, N-CHANNEL
IGNITION IGBT

■ DESCRIPTION

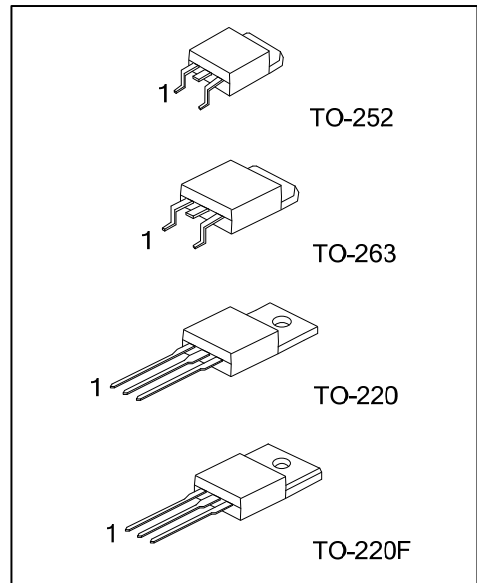
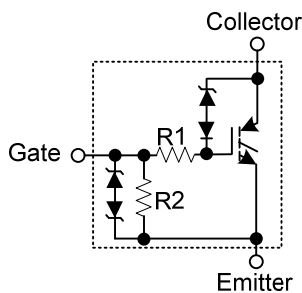
The UTC **ISL9V3040D3S** is an N-channel ignition Insulated Gate Bipolar Transistor. It uses UTC's advanced technology to provide customers with outstanding SCIS capability.

The UTC **ISL9V3040D3S** is suitable for Coil -On plug applications and Automotive Ignition Coil driver circuits, etc.

■ FEATURES

- * Outstanding SCIS capability
- * Logic level gate drive

■ SYMBOL



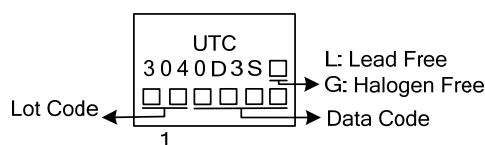
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
ISL9V3040D3SL-TA3-T	ISL9V3040D3SG-TA3-T	TO-220	G	C	E	Tube
ISL9V3040D3SL-TF3-T	ISL9V3040D3SG-TF3-T	TO-220F	G	C	E	Tube
ISL9V3040D3SL-TN3-R	ISL9V3040D3SG-TN3-R	TO-252	G	C	E	Tape Reel
ISL9V3040D3SL-TQ2-T	ISL9V3040D3SG-TQ2-T	TO-263	G	C	E	Tube
ISL9V3040D3SL-TQ2-R	ISL9V3040D3SG-TQ2-R	TO-263	G	C	E	Tape Reel

Note: Pin Assignment: G: Gate C: Collector E: Emitter

<p>ISL9V3040D3SL-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TN3: TO-252 TQ2: TO-263 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
----------------------------	--

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector to Emitter Breakdown Voltage		BV_{CER}	450	V
Emitter to Collector Voltage Reverse Battery Condition		BV_{ECS}	30	V
At Starting	$T_J=25^\circ\text{C}$, $I_{\text{SCIS}}=14.2\text{A}$, $L=3.0\text{mHy}$	E_{SCIS}	300	mJ
	$T_J=150^\circ\text{C}$, $I_{\text{SCIS}}=10.6\text{A}$, $L=3.0\text{mHy}$		170	mJ
Continuous Collector Current	$T_C=25^\circ\text{C}$	I_C	21	A
	$T_C=110^\circ\text{C}$		17	A
Gate to Emitter Voltage Continuous		V_{GEM}	± 10	V
Power Dissipation Total at $T_C=25^\circ\text{C}$	TO-220/TO-263	P_D	125	W
	TO-220F		41.6	
	TO-252		125	
Power Dissipation Derating $T_C>25^\circ\text{C}$	TO-220/TO-263		1	$\text{W}/^\circ\text{C}$
	TO-220F		0.332	
	TO-252		1	
Electrostatic Discharge Voltage at 100pF, 1500 Ω		ESD	4	kV
Junction Temperature		T_J	-40~175	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-40~175	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-220/TO-252	θ_{JC}	1.0	$^\circ\text{C}/\text{W}$
	TO-263			
	TO-220F		3.0	

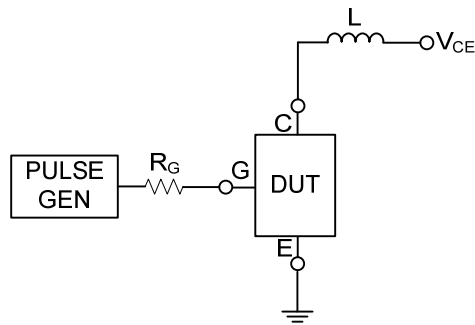
■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Off State Characteristics							
Collector to Emitter Breakdown Voltage	BV_{CER}	$I_C=2\text{mA}$, $V_{GE}=0\text{V}$, $R_G=1\text{K}\Omega$, $T_J=-40\sim 150^\circ\text{C}$	350	400	450	V	
Collector to Emitter to Breakdown Voltage	BV_{CES}	$I_C=10\text{mA}$, $V_{GE}=0\text{V}$, $R_G=0$, $T_J=-40\sim 150^\circ\text{C}$	400	450	500	V	
Emitter to Collector Breakdown Voltage	BV_{ECS}	$I_C=-75\text{mA}$, $V_{GE}=0\text{V}$, $T_C=25^\circ\text{C}$	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}	$V_{CER}=250\text{V}$, $R_G=1\text{K}\Omega$	$T_C=25^\circ\text{C}$		25	μA	
			$T_C=150^\circ\text{C}$		1	mA	
Emitter to Collector Leakage Current	I_{ECS}	$V_{EC}=24\text{V}$	$T_C=25^\circ\text{C}$		1	mA	
			$T_C=150^\circ\text{C}$		40	mA	
Series Gate Resistance	R_1			70		Ω	
Gate to Emitter Resistance	R_2		10K		26K	Ω	
On State Characteristics							
Collector to Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=6\text{A}$, $V_{GE}=4\text{V}$	$T_C=25^\circ\text{C}$		1.25	1.60	V
		$I_C=10\text{A}$, $V_{GE}=4.5\text{V}$	$T_C=150^\circ\text{C}$		1.40	1.80	V
		$I_C=15\text{A}$, $V_{GE}=4.5\text{V}$	$T_C=150^\circ\text{C}$		1.90	2.20	V
Dynamic Characteristics							
Gate Charge	$Q_{G(ON)}$	$I_C=10\text{A}$, $V_{CE}=12\text{V}$, $V_{GE}=5\text{V}$		17		nC	
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	$I_C=1.0\text{mA}$, $V_{CE}=V_{GE}$	1.3		2.2	V	
Gate to Emitter Plateau Voltage	V_{GEP}	$I_C=10\text{A}$, $V_{CE}=12\text{V}$		3.0		V	
Switching Characteristics							
Current Turn-On Delay Time-Resistive	$t_{d(ON)R}$	$V_{CE}=14\text{V}$, $R_L=1\Omega$, $V_{GE}=5\text{V}$, $R_G=1\text{K}\Omega$, $T_J=25^\circ\text{C}$		0.48	4	μs	
Current Rise Time-Resistive	t_{rR}			2.1	7	μs	
Current Turn-Off Delay Time-Inductive	$t_{d(OFF)L}$			1.4	15	μs	
Current Fall Time Inductive	t_{fL}			2.2	15	μs	
Self Clamped Inductive Switching	SCIS	$T_J=25^\circ\text{C}$, $L=3.0\text{mH}$, $R_G=1\text{K}\Omega$, $V_{GE}=5\text{V}$			300	mJ	

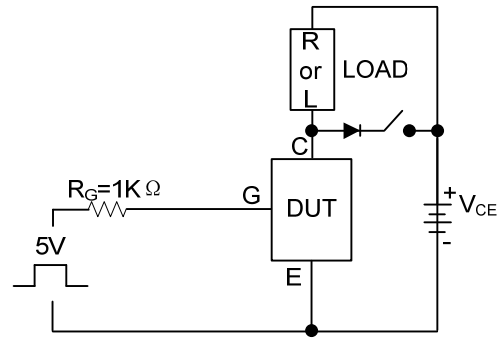
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

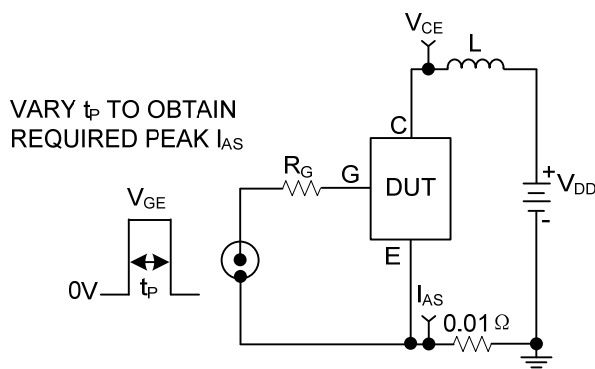
■ TEST CIRCUIT AND WAVEFORMS



Inductive Switching Test Circuit

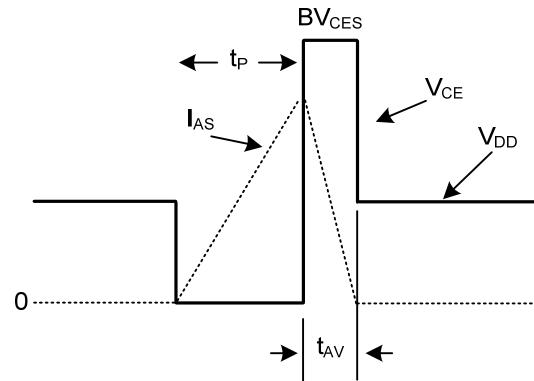


t_{ON} and t_{OFF} Switching Test Circuit



VARY t_p TO OBTAIN
REQUIRED PEAK I_{AS}

Energy Test Circuit



Energy Waveforms

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.