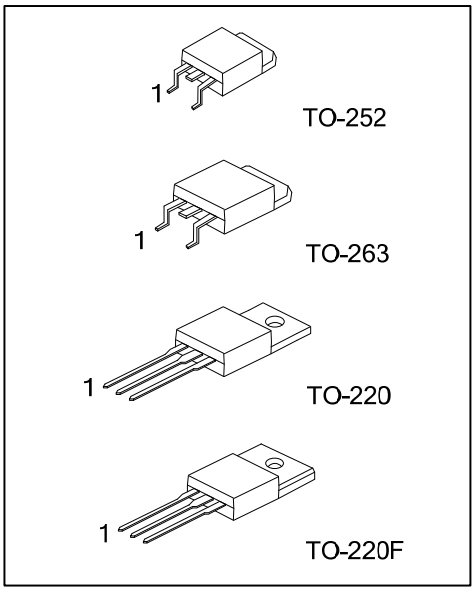
ISL9V3040D3S

Insulated Gate Bipolar Transistor

300mJ, 400V, N-CHANNEL IGNITION IGBT



■ DESCRIPTION

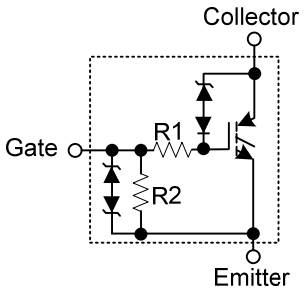
The UTC **ISL9V3040D3S** is an N-channel ignition Insulated Gate Bipolar Transistor. It uses UTC's advanced technology to provide customers with outstanding SCIS capability.

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

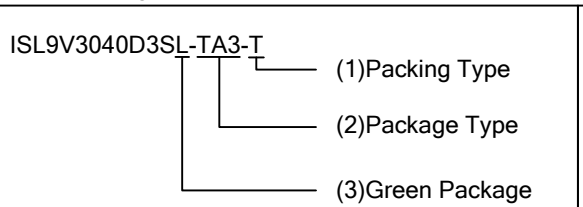
■ SYMBOL



■ ORDERING INFORMATION

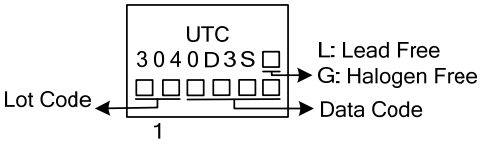
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
ISL9V3040D3SL-TA3-T	ISL9V3040D3SG-TA3-T	TO-220	G	C	E	Tube
ISL9V3040D3SL-TF3-T	ISL9V3040D3SG-TF3-T	TO-220F	G	C	E	Tube
ISL9V3040D3SL-TN3-R	ISL9V3040D3SG-TN3-R	TO-252	G	C	E	Tape Reel
ISL9V3040D3SL-TQ2-T	ISL9V3040D3SG-TQ2-T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



(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

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°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°C, I_{SCIS}=14.2A, L=3.0mHy	E_{SCIS}	300	mJ
	T_J= 150°C, I_{SCIS}=10.6A, L=3.0mHy		170	mJ
Continuous Collector Current	T_C=25°C	I_C	21	A
	T_C=110°C		17	A
Gate to Emitter Voltage Continuous		V_{GEM}	±10	V
Power Dissipation Total at T_C=25°C	TO-220/TO-263	P_D	125	W
	TO-220F		41.6	
	TO-252		125	
Power Dissipation Derating T_C>25°C	TO-220/TO-263		1	W/°C
	TO-220F		0.332	
	TO-252		1	
Electrostatic Discharge Voltage at 100pF, 1500Ω		ESD	4	kV
Junction Temperature		T_J	-40~175	°C
Storage Temperature Range		T_{STG}	-40~175	°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

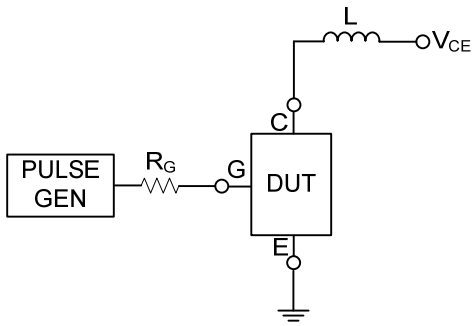
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	TO-220/TO-252 TO-263	θ_{JC}	1.0	°C/W
	TO-220F		3.0	

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise noted)

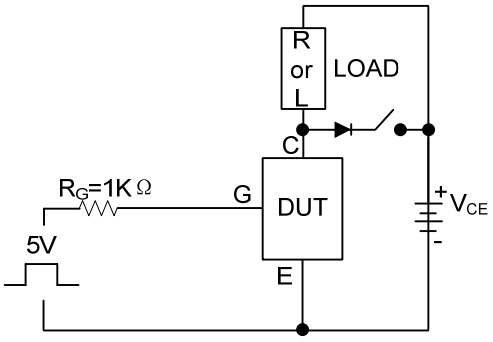
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Off State Characteristics							
Collector to Emitter Breakdown Voltage	BV_{CER}	I_C=2mA, V_{GE}=0V, R_G=1KΩ, T_J=-40~150°C		350	400	450	V
Collector to Emitter to Breakdown Voltage	BV_{CES}	I_C=10mA, V_{GE}=0V, R_G=0, T_J=-40~150°C		400	450	500	V
Emitter to Collector Breakdown Voltage	BV_{ECS}	I_C=-75mA, V_{GE}=0V, T_C=25°C		30			V
Gate to Emitter Breakdown Voltage	BV_{GES}	I_{GES}=±2mA		±12	±14		V
Collector to Emitter Leakage Current	I_{CER}	V_{CER}=250V, R_G=1KΩ	T_C=25°C			25	μA
			T_C=150°C			1	mA
Emitter to Collector Leakage Current	I_{ECS}	V_{EC}=24V	T_C=25°C			1	mA
			T_C=150°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=6A, V_{GE}=4V	T_C=25°C		1.25	1.60	V
		I_C=10A, V_{GE}=4.5V	T_C=150°C		1.40	1.80	V
		I_C=15A, V_{GE}=4.5V	T_C=150°C		1.90	2.20	V
Dynamic Characteristics							
Gate Charge	$Q_{G(ON)}$	I_C=10A, V_{CE}=12V, V_{GE}=5V			17		nC
Gate to Emitter Threshold Voltage	$V_{GE(TH)}$	I_C=1.0mA, V_{CE}=V_{GE}		1.3		2.2	V
Gate to Emitter Plateau Voltage	V_{GEP}	I_C=10A, V_{CE}=12V			3.0		V
Switching Characteristics							
Current Turn-On Delay Time-Resistive	$t_{d(ON)R}$	V_{CE}=14V, R_L=1Ω, V_{GE}=5V, R_G=1KΩ, T_J=25°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°C, L=3.0mHy, R_G=1KΩ, V_{GE}=5V				300	mJ

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

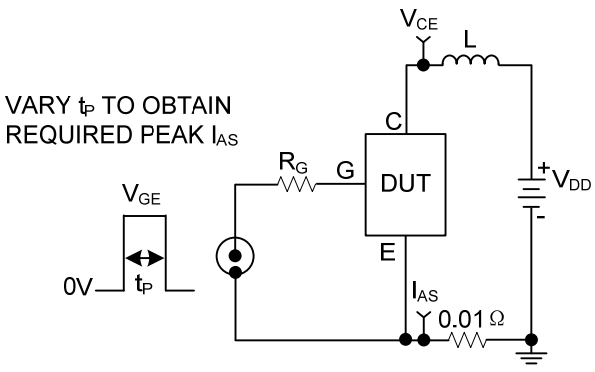
■ TEST CIRCUIT AND WAVEFORMS



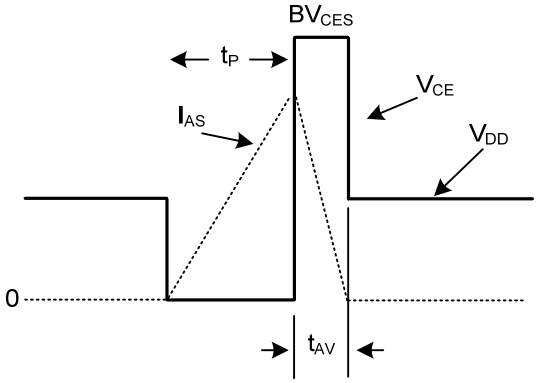
Inductive Switching Test Circuit



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



Energy Test Circuit



Energy Waveforms