ISL9V5045S3ST
EcoSPARK® N-Channel Ignition IGBT
500mJ, 450V

Features

- SCIS Energy = 500mJ at T_J = 25°C
- Logic Level Gate Drive
- Qualified to AEC Q101
- RoHS Compliant

Applications

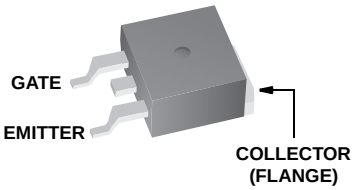
- Automotive Ignition Coil Driver Circuits
- Coil - On Plug Applications

General Description

The ISL9V5045S3ST is next generation ignition IGBT that offer outstanding SCIS capability in the industry standard D2-Pak (TO-263) plastic package. This device is intended for use in automotive ignition circuits, specifically as a coil drivers. Internal diodes provide voltage clamping without the need for external components.

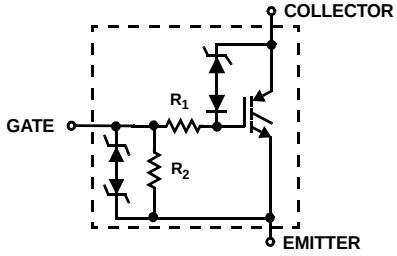
EcoSPARK® devices can be custom made to specific clamp voltages. Contact your nearest Fairchild sales office for more information.

Package



JEDEC TO-263AB
D^2-Pak

Symbol



Device Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
BV_{CER}	Collector to Emitter Breakdown Voltage (I_C = 1 mA)	480	V
BV_{ECS}	Emitter to Collector Voltage - Reverse Battery Condition (I_C = 10 mA)	24	V
E_{SCIS25}	At Starting T_J = 25°C, I_{SCIS} = 39.2A, L = 650 µHy	500	mJ
$E_{SCIS150}$	At Starting T_J = 150°C, I_{SCIS} = 31.1A, L = 650 µHy	315	mJ
I_{C25}	Collector Current Continuous, At T_C = 25°C, See Fig 9	51	A
I_{C110}	Collector Current Continuous, At T_C = 110°C, See Fig 9	43	A
V_{GEM}	Gate to Emitter Voltage Continuous	±10	V
P_D	Power Dissipation Total T_C = 25°C	300	W
	Power Dissipation Derating T_C > 25°C	2	W/°C
T_J	Operating Junction Temperature Range	-40 to 175	°C
T_{STG}	Storage Junction Temperature Range	-40 to 175	°C
T_L	Max Lead Temp for Soldering (Leads at 1.6mm from Case for 10s)	300	°C
T_{pkg}	Max Lead Temp for Soldering (Package Body for 10s)	260	°C
ESD	Electrostatic Discharge Voltage at 100pF, 1500Ω	4	kV

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
V5045S	ISL9V5045S3ST	TO-263AB	330mm	24mm	800

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
Off State Characteristics							
BV_{CER}	Collector to Emitter Breakdown Voltage	I_C = 2mA, V_{GE} = 0, R_G = 1KΩ, See Fig. 15 T_J = -40 to 150°C		420	450	480	V
BV_{CES}	Collector to Emitter Breakdown Voltage	I_C = 10mA, V_{GE} = 0, R_G = 0, See Fig. 15 T_J = -40 to 150°C		445	475	505	V
BV_{ECS}	Emitter to Collector Breakdown Voltage	I_C = -75mA, V_{GE} = 0V, T_C = 25°C		30	-	-	V
BV_{GES}	Gate to Emitter Breakdown Voltage	I_{GES} = ± 2mA		±12	±14	-	V
I_{CER}	Collector to Emitter Leakage Current	V_{CER} = 320V, R_G = 1KΩ, See Fig. 11	T_C = 25°C	-	-	25	µA
			T_C = 150°C	-	-	1	mA
I_{ECS}	Emitter to Collector Leakage Current	V_{EC} = 24V, See Fig. 11	T_C = 25°C	-	-	1	mA
			T_C = 150°C	-	-	40	mA
R_1	Series Gate Resistance			-	100	-	Ω
R_2	Gate to Emitter Resistance			10K	-	30K	Ω
On State Characteristics							
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_C = 10A, V_{GE} = 4.0V	T_C = 25°C, See Fig. 4	-	1.25	1.60	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_C = 15A, V_{GE} = 4.5V	T_C = 150°C	-	1.47	1.80	V

Dynamic Characteristics

$Q_{G(ON)}$	Gate Charge	I_C = 10A, V_{CE} = 12V, V_{GE} = 5V, See Fig. 14		-	32	-	nC
$V_{GE(TH)}$	Gate to Emitter Threshold Voltage	I_C = 1.0mA, V_{CE} = V_{GE}, See Fig. 10	T_C = 25°C	1.3	-	2.2	V
			T_C = 150°C	0.75	-	1.8	V
V_{GEP}	Gate to Emitter Plateau Voltage	I_C = 10A,	V_{CE} = 12V	-	3.0	-	V

Switching Characteristics

$t_{d(ON)R}$	Current Turn-On Delay Time-Resistive	V_{CE} = 14V, R_L = 1Ω, V_{GE} = 5V, R_G = 1KΩ T_J = 25°C, See Fig. 12	-	0.7	4	µs
t_{rR}	Current Rise Time-Resistive		-	2.1	7	µs
$t_{d(OFF)L}$	Current Turn-Off Delay Time-Inductive	V_{CE} = 300V, L = 2mH, V_{GE} = 5V, R_G = 1KΩ T_J = 25°C, See Fig. 12	-	10.8	15	µs
t_{fL}	Current Fall Time-Inductive		-	2.8	15	µs
SCIS	Self Clamped Inductive Switching	T_J = 25°C, L = 650 µH, R_G = 1KΩ, V_{GE} = 5V, See Fig. 1 & 2	-	-	500	mJ

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction-Case	TO-263	-	-	0.5	°C/W

Typical Characteristics

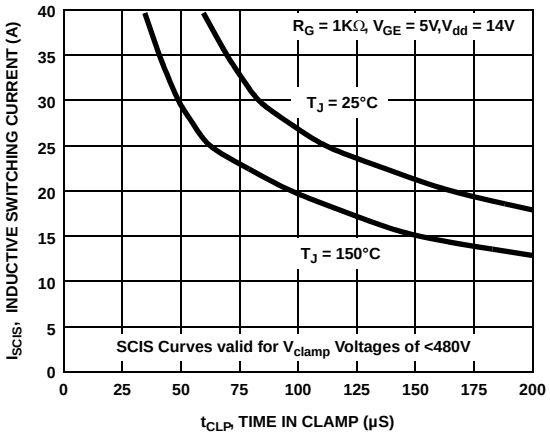


Figure 1. Self Clamped Inductive Switching Current vs Time in Clamp

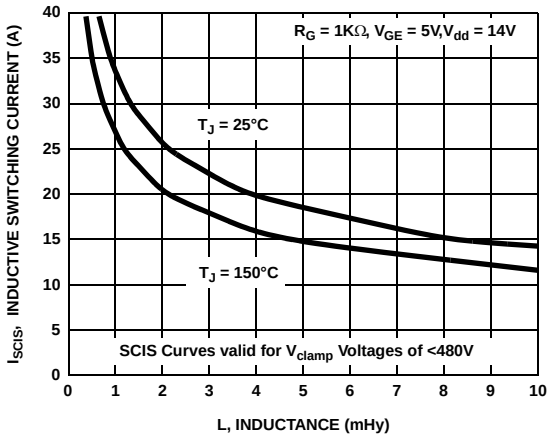


Figure 2. Self Clamped Inductive Switching Current vs Inductance