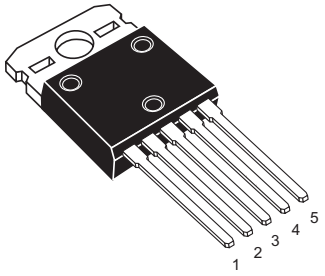
STL12IE90

900 V - 12 A - 90 mΩ
POWER CASCODE MONOLITHIC CONFIGURATION

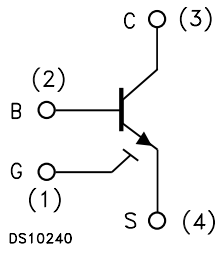
ADVANCE DATA

- HIGH VOLTAGE / HIGH CURRENT CASCODE CONFIGURATION
- LOW EQUIVALENT ON RESISTANCE
- VERY FAST-SWITCH UP TO 150 KHz
- SQUARED RBSOA UP TO 900 V
- VERY LOW C_{ISS} DRIVEN BY R_G = 56 Ω
- VERY LOW TURN-OFF CROSS OVER TIME

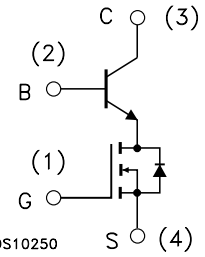


SOT-93 5 Leads

INTERNAL SCHEMATIC DIAGRAM



Electrical Symbol



Device Structure

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CS(SS)}$	Collector-Source Voltage (V_{BS} =V_{GS} = 0V)	900	V
$V_{BS(OS)}$	Base-SourceVoltage (I_C = 0, V_{GS} = 0V)	30	V
$V_{SB(OS)}$	Source-Base Voltage (I_C = 0, V_{GS} = 0V)	25	V
V_{GS}	Gate-Source Voltage	± 20	V
I_C	Collector Current	12	A
I_{CM}	Collector Peak Current ($t_p \leq 5$ ms)	30	A
I_B	Base Current	6	A
I_{BM}	Base Peak Current ($t_p \leq 1$ ms)	12	A
P_{tot}	Total Dissipation at T_c = 25 °C	tbd	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-Case Max	tbd	°C/W
$R_{thc\text{-}h}$	Thermal Resistance Case-heatsink With Conductive Grease Applied Max	tbd	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CS(SS)}$	Collector-Source Current (V_{BS} = V_{GS} =0 V)	$V_{CS(SS)}$ = 900 V			100	µA
$I_{BS(OS)}$	Base-Source Current (I_C = 0, V_{GS} =0 V)	$V_{BS(OS)}$ = 30 V			10	µA
$I_{SB(OS)}$	Source-Base Current (I_C = 0, V_{GS} =0 V)	$V_{SB(OS)}$ = 15 V			100	µA
$I_{GS(S)}$	Gate-Source Leakage (V_{BS} = 0 V)	V_{GS} = ± 20 V			100	nA
$V_{CS(ON)}$	Collector-Source ON Voltage	V_{GS} = 10 V I_C = 7 A $V_{B'S}$ = 1.5 V $R_{B'B}$ = 0.33 Ω (see figure 1)		0.75	1	V
$R_{CS(ON)}$	Equivalent ON Resistance	V_{GS} = 10 V I_C = 7 A $V_{B'S}$ = 1.5 V $R_{B'B}$ = 0.33 Ω (see figure 1)		90	120	mΩ
h_{FE}	DC Current Gain	I_C = 7 A V_{CS} = 2 V V_{GS} = 10 V	12	14	17	
$V_{BS(ON)}$	Base-Source ON Voltage	I_C = 7 A I_B = 0.7 A V_{GS} = 10 V		1.3	1.7	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{BS} = V_{GS} I_B = 250 µA	2.8	3.5	4.0	V
C_{iss}	Input Capacitance	V_{BS} = 25 V f = 1 MHz V_{GS} = 0		550		pF
Q_{GS}	Gate-Source Charge	V_{GS} = 10 V I_B = 5 A		22		nC
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	I_C = 7 A V_{CC} = 300 V V_{clamp} = 800 V $V_{B'S}$ = 1.4 V $R_{B'B}$ = 0.33 Ω R_G = 56 Ω (see figure 2)		0.6 15		µs ns
$t_{d(on)}$	INDUCTIVE LOAD Time Delay Turn-on	I_C = 4 A V_{CC} = 300 V R_G = 56 Ω $C_{B'S}$ = 220 nF V_{GS} = 10 V $I_{B(on)}$ = 4 A (see figure 3)		100		ns
$t_{r(on)}$	INDUCTIVE LOAD Time Rise Turn-off	I_C = 4 A V_{CC} = 300 V R_G = 56 Ω $C_{B'S}$ = 220 nF V_{GS} = 10 V $I_{B(on)}$ = 4 A (see figure 3)		45		ns
$V_{CS(dyn)}$	Collector-Source Dynamic Voltage	I_C = 4 A V_{CC} = 300 V R_G = 56 Ω $C_{B'S}$ = 220 nF V_{GS} = 10 V $I_{B(on)}$ = 4 A @ 200 ns @ 500 ns (see figure 3)		6.5 1.3		V V
V_{CSW}	Maximum Collector Source Voltage without Snubber	I_{CWoff} = 7 A V_{CC} = 300 V V_{clamp} = 900 V $V_{B'S}$ = 1.4 V $R_{B'B}$ = 0.33 Ω R_G = 56 Ω (see figure 2)	900			V

Reverse Biased SOA

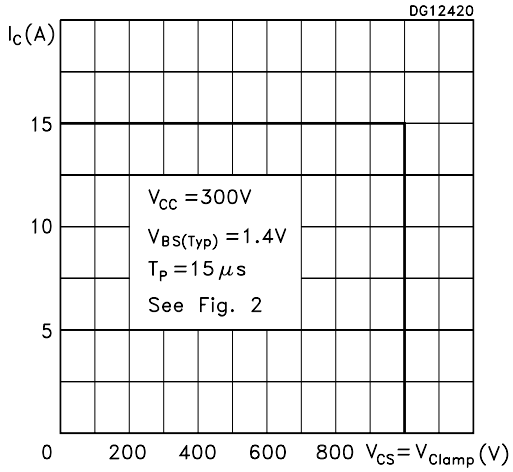


Figure 1: Static $V_{CS(ON)}$ Test Circuit

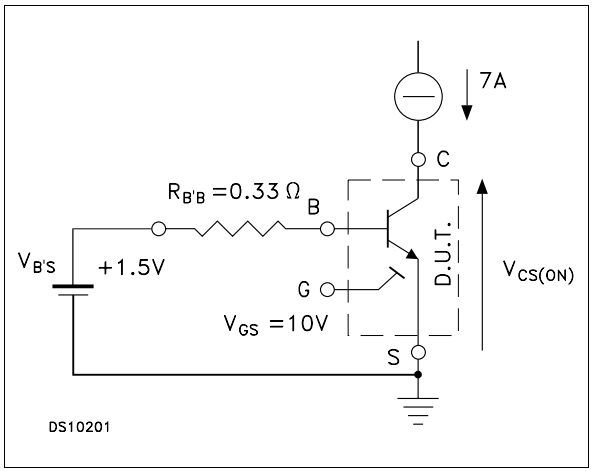


Figure 2: Inductive Load Switching and RBSOA Test Circuit

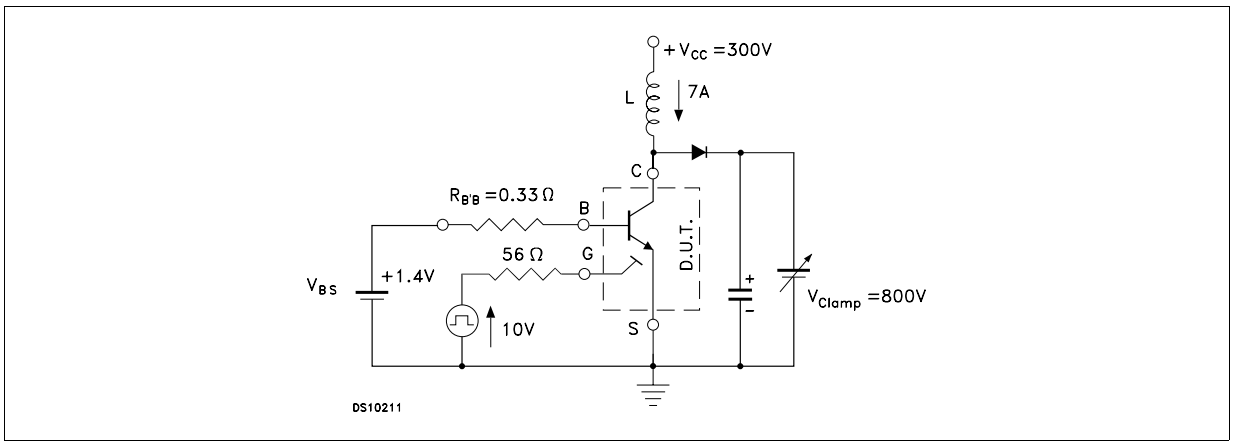
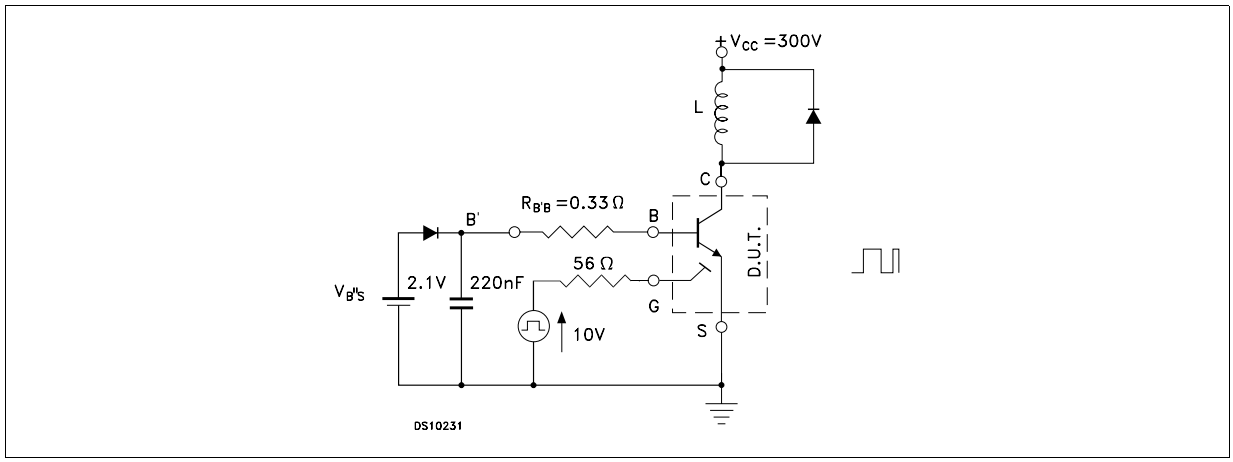


Figure 3: Collector-Emitter Dynamic Voltage Test Circuit



SOT93-5L MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40	4.50	4.70	0.173	0.177	0.185
C	1.90	2.00	2.10	0.075	0.078	0.082
D	1.90		2.85	0.075		0.112
D1	2.30		2.55	0.090		0.100
E	0.48		0.57	0.019		0.022
F	1.05		1.25	0.039		0.051
F1	0.01		0.25	0.00039		0.0098
F2		1.35			0.053	
G	4.88	5.08	5.28	0.192	0.200	0.207
G1	9.96	10.16	10.36	0.392	0.400	0.407
G2		8.90			0.350	
H	15.00	15.10	15.20	0.590	0.594	0.598
H1	14.90		15.30	0.586		
H2		12.05			0.474	
L	12.10	12.26	12.26	0.476	0.482	0.482
L1	15.90	16.10	16.30	0.625	0.633	0.641
L2	19.90	20.10	20.30	0.783	0.791	0.799
L3		18.00			0.708	
L4		0.80			0.031	
L6	29.50	29.75	30.10	1.161	1.171	1.185
S		2.90			0.114	
S1		1.60			0.062	
V		30^o				0.100
V1		6^o			0.084	
V2		10^o			0.05	
DIA		4.00			0.157