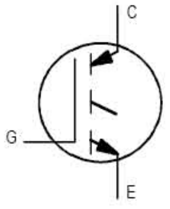
Features

- High short circuit rating optimized for motor control
- Low conduction losses
- High switching speed
- Tighter parameter distribution

V_{CES}=1200 V
$V_{CE(on)\ typ.}$ =3,8 V
@V_{GE} =15V, Ic=20A



N-channel

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Units	Max
Collector-to-Emitter Voltage	V_{CES}	V	1200
Continuous Collector Current	I_C @ Tc=25˚C	A	20
Continuous Collector Current	I_C @ Tc=100˚C		10
Pulsed Collector Current [1]	I_{CM}		41
Clamped Inductive Load Current [2]	I_{LM}		41
Short Circuit Withstand Time	tsc	μs	10
Maximum Power Dissipation	P_D @ Tc=25˚C	W	100
Maximum Power Dissipation	P_D @ Tc=100˚C		42
Gate–to-Emitter Voltage	V_{GE}	V	±20
Operating Junction and Storage temperature Range	T_J T_{STG}	ºC	-55 to +150
Soldering Temperature, for 10 seconds		ºC	300

THERMAL RESISTANCE

Parameter	Symbol	Units	Min	Typ.	Max
Junction-to-Case	$R_{\Theta JC}$	˚C/W	-	-	1,2
Case-to-Sink, Flat, Greased Surface	$R_{\Theta CS}$		-	0,24	-
Junction-to-Ambient, typical socket mount	$R_{\Theta JA}$		-	-	40

ELECTRICAL CHARACTERISTICS (T_j =25 °C)

Parameter	Symbol	Units	Test Conditions	Min	Typ.	Max
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	V	V_{GE} = 0V, I_C = 250μA	1200	-	-
Emitter-to-Collector Breakdown Voltage	$V_{(BR)ECS}$	V	V_{GE} = 0V, I_C = 1A	18	-	-
Breakdown Voltage Temp.Coefficient	$\Delta V_{(BR)CES}/\Delta T_J$	V/˚C	V_{GE} = 0V, I_C = 2 mA	-	0,2	-
Collector-to-Emitter Saturation Voltage (See figure 2,5)	$V_{CE(ON)}$	V	V_{GE} = 15V, I_C = 10A	-	3,0	4,0
			V_{GE} = 15V, I_C = 20A	-	3,8	-
			V_{GE} = 15V, I_C = 10A T_J =150˚C	-	2,9	-
Gate Threshold Voltage	$V_{GE(th)}$	V	V_{GE}=V_{CE}, I_C =250 μA	3,0	-	6,0
Threshold Voltage Temp.Coefficient	$\Delta V_{(GE)th}/\Delta T_J$	mV/˚C	V_{GE}=V_{CE}, I_C =250μA	-	-11	-
Forward Transconductance	$g_{(fe)}$	S	V_{CE} = 100V, I_C = 10A	4,3	6,8	-
Zero Gate Voltage Collector Current	I_{CES}	µA	V_{CE} = 1200V, V_{GE} =0V	-	-	250
			V_{CE} = 10V, V_{GE} =0V TJ=25˚C	-	-	2,0
			V_{CE} = 1200V, V_{GE} =0V T_J =150˚C	-	-	2000
Gate-to-Emitter Leakage Current	I_{GES}	nA	V_{GS} = ±20V			±100

SWITCHING CHARACTERISTICS (T_j =25 °C)

Parameter	Symbol	Units	Test Conditions	Min	Typ.	Max
Total Gate Charge (turn on)	Q_g	nC	V_{GE} = 15V,V_{CC} = 400V, I_C =10A See Figure 8	-	54	80
Gate-to-Emitter Charge (turn on)	Q_{ge}			-	12	14
Gate-to-Collector Charge (turn on)	Q_{gc}			-	24	32
Turn-On Delay Time	$t_{d(on)}$	ns	V_{CC} =960V, I_C =10A V_{GE} = 15V R_G=23Ω Energy losses include «tail» See Figure 9,10,14	-	30	-
Rise Time	t_r			-	27	-
Turn-Off Delay Time	$t_{d(off)}$			-	230	300
Fall Time	t_f			-	130	170
Turn-On Switching Loss	E_{on}	mJ		-	0,66	-
Turn-Off Switching Loss	E_{off}			-	0,94	-
Total Switching Loss	E_{tS}			-	1,6	2,4
Turn-On Delay Time	$t_{d(on)}$	ns	T_J =150˚C V_{CC} =960V, I_C =10A V_{GE} = 15V R_G=23 Ω Energy losses include «tail» See Figure 10,11,14	-	29	-
Rise Time	t_r			-	28	-
Turn-Off Delay Time	$t_{d(off)}$			-	340	-
Fall Time	t_f			-	350	-
Total Switching Loss	E_{tS}	mJ		-	3,3	-
Input Capacitance	C_{ISS}	pF	V_{GE} = 0V,V_{CC} = 30V, f = 1.0MHz See Figure 7	-	830	-
Output Capacitance	C_{OSS}			-	630	-
Reverse Transfer Capacitance	C_{RSS}			-	16	-

NOTES:

[1] Repetitive rating; V_{GE} =20V, pulse width limited by max junction temperature.(Fig.13b)

[2] V_{CC}=80%(V_{CES}), L= 10 µH, V_{GE} = 20V, R_G=23 Ω,(Fig.13a)

[3] Pulse width ≤80 µs, duty factor ≤0,1%.

[4] Pulse width 5,0µs single short.

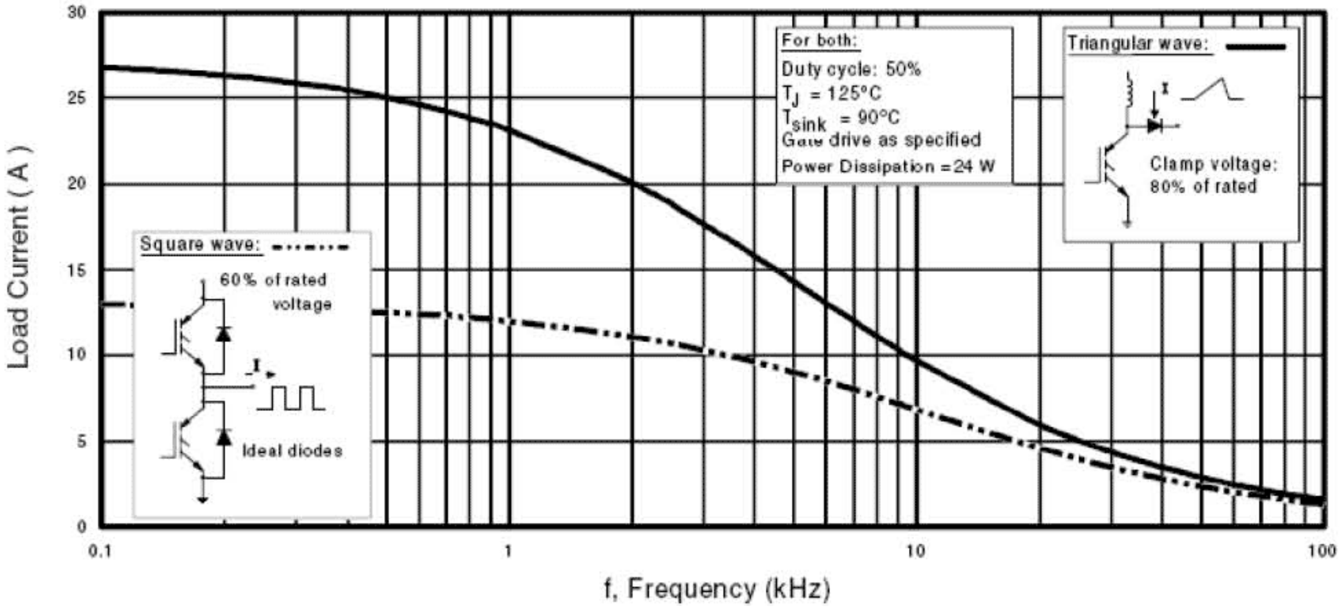


Fig.1- Typical Load Current vs. Frequency

(Load Current=I_{RMS} of fundamental)

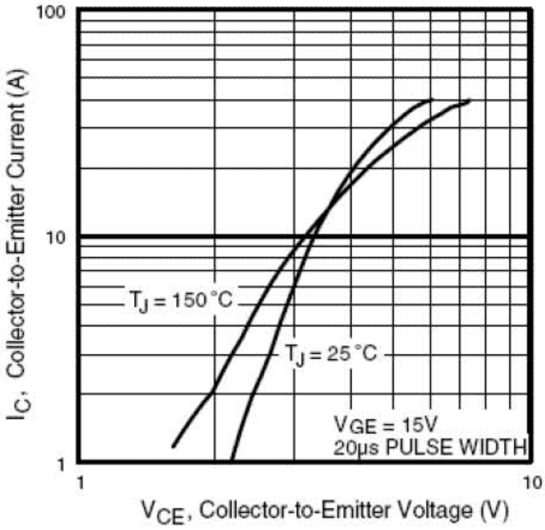


Fig.2-Typical Output Characteristics

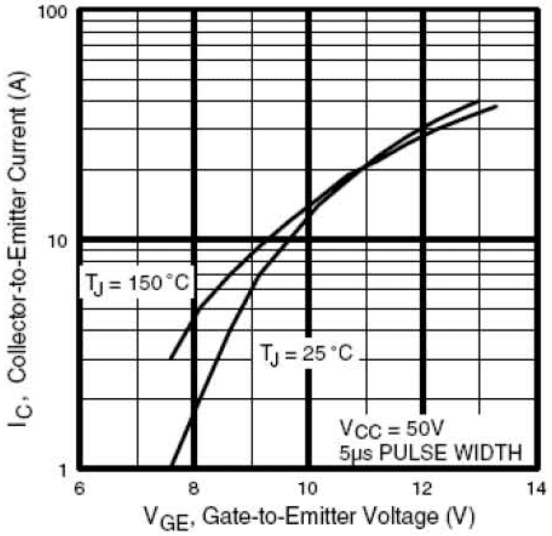


Fig.3-Typical Transfer Characteristics

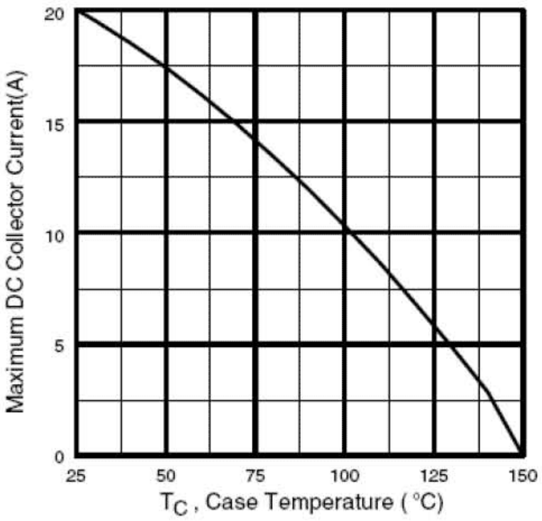


Fig.4-Maximum Collector Current vs. Case Tempertaure

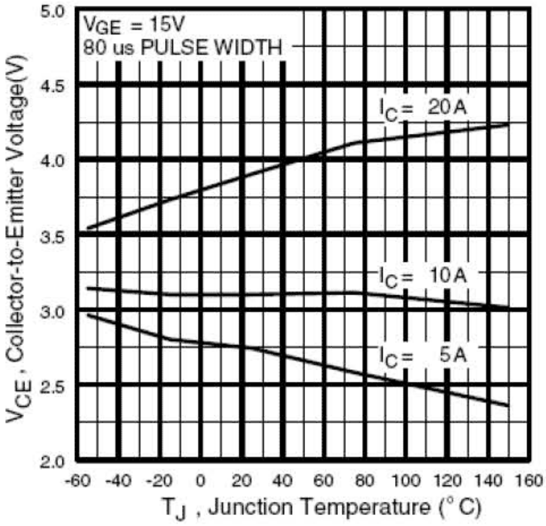


Fig.5 – Typical Collector-to-Emitter Voltage Vs. Junction Temperature

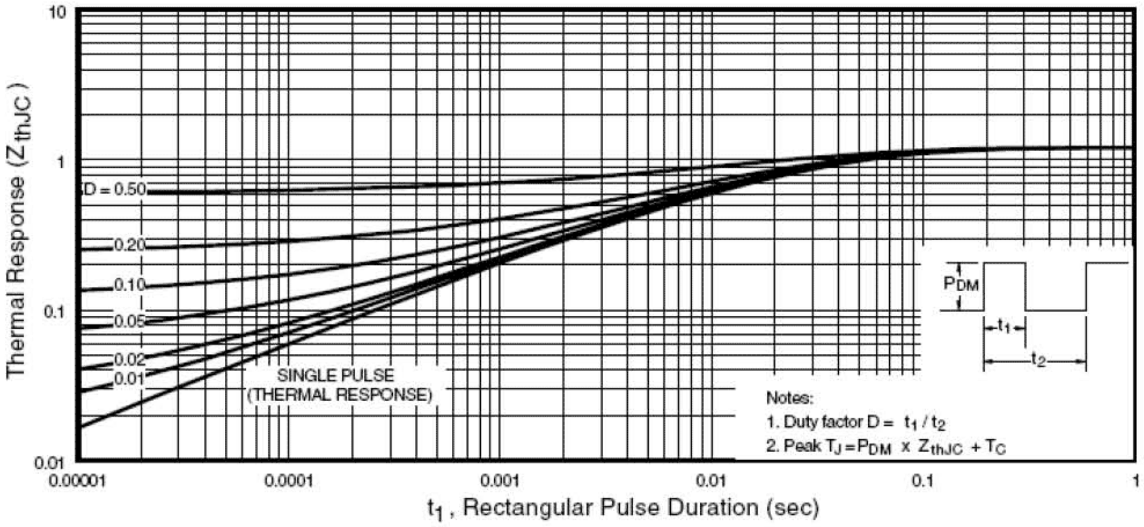


Fig. 6 – Maximum Effective Transient ThermalImpedance, Junction-to-Case

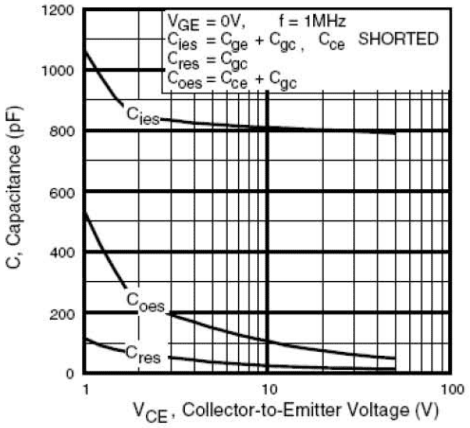


Fig.7 – Typical Capacitance vs. Collector-to-Emitter Voltage

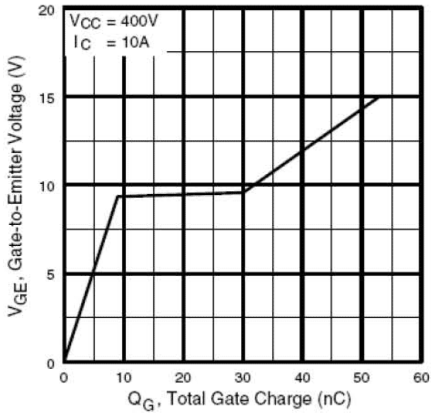


Fig.8- Typical Gate Charge vs. Gate-to-Emitter Voltage

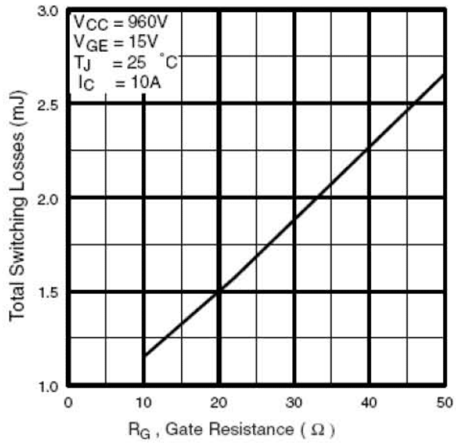


Fig.9 – Typical Switching Losses vs. Gate Resistance

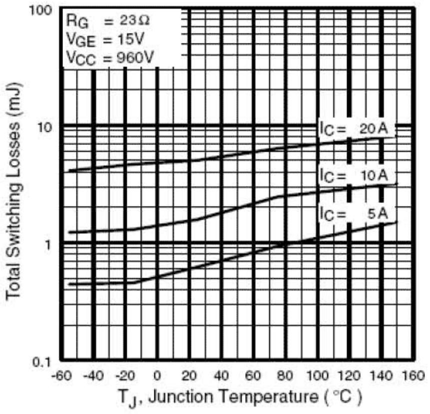


Fig. 10 – Typical Switching Losses vs. Junction Temperature

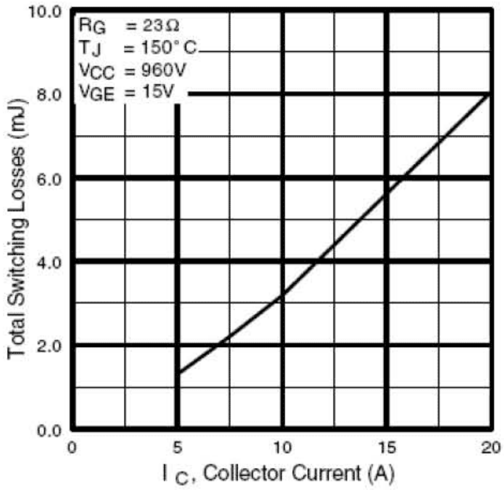


Fig. 11 – Typical Switching Losses vs. Colector-to-Emitter Current

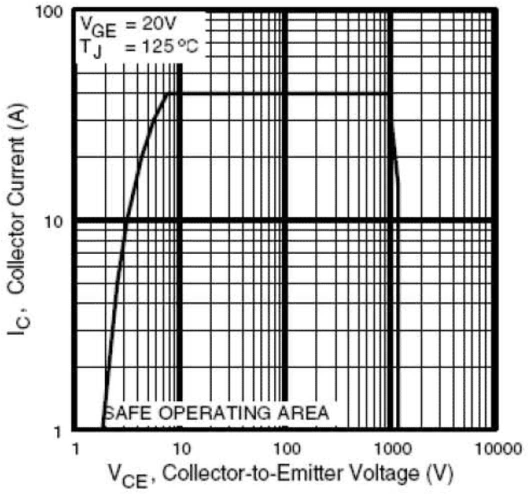
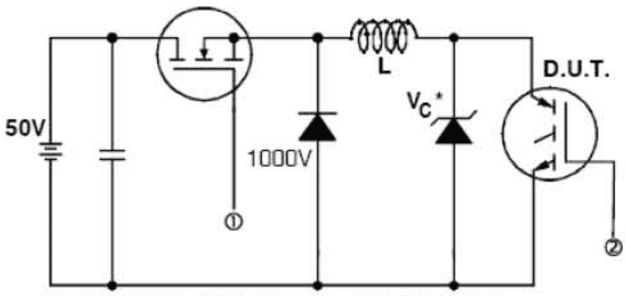


Fig. 12 – Turn-Off SOA



* Driver same type as D.U.T.; Vc = 80% of Vce(max)
* Note: Due to the 50V power supply, pulse width and inductor will increase to obtain rated Id.

Fig. 13a – Clamped Inductive Load Test CIrcuit

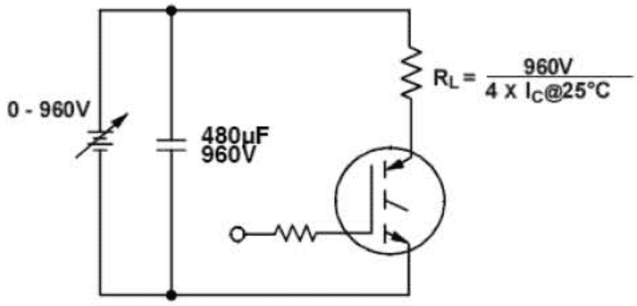


Fig.13b-Pulsed Collector Current Test Circuit

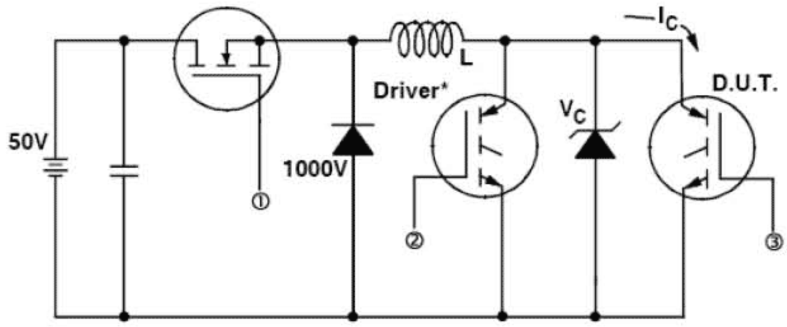


Fig. 14a - Switching Loss Test Circuit

* Driver same type as D.U.T., VC = 960V

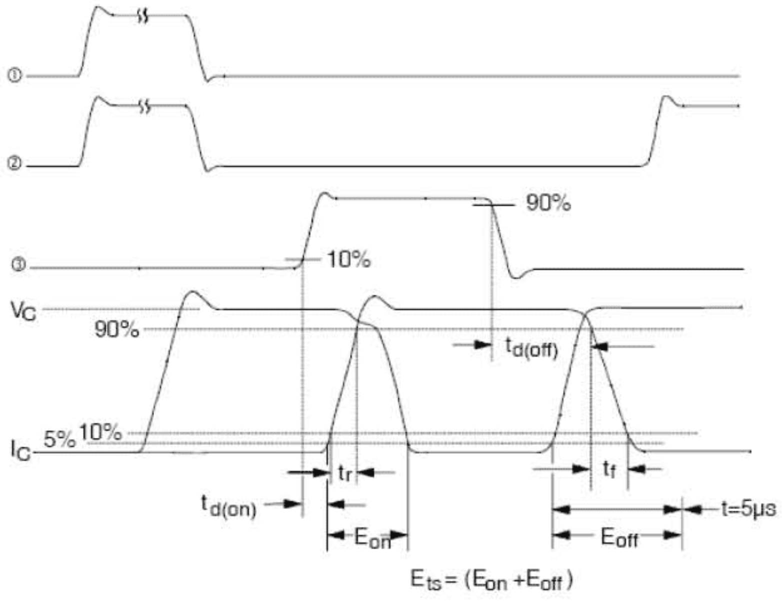


Fig. 14b - Switching Loss Waveforms