Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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RGPR10BM40FH

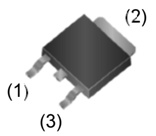
430V 20A Ignition IGBT

Datasheet

BV_{CES}	430±30V
I_C	20A
$V_{CE(sat)}$ (Typ.)	1.6V
E_{AS}	250mJ

●Outline

TO-252



●Features

1) Low Collector - Emitter Saturation Voltage

2) High Self-Clamped Inductive Switching Energy

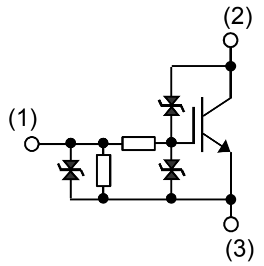
3) Built in Gate-Emitter Protection Diode

4) Built in Gate-Emitter Resistance

5) Qualified to AEC-Q101

6) Pb - free Lead Plating ; RoHS Compliant

●Inner Circuit



(1) Gate
(2) Collector
(3) Emitter

●Applications

Ignition Coil Driver Circuits

Solenoid Driver Circuits

●Packaging Specifications

Type	Packaging	Taping
	Reel Size (mm)	330
	Tape Width (mm)	16
	Basic Ordering Unit (pcs)	2,500
	Packing Code	TL
	Marking	RGPR10BM40

●Absolute Maximum Ratings (at T_C = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Collector - Emitter Voltage		V_{CES}	460	V
Emitter-Collector Voltage (V_{GE} = 0V)		V_{EC}	25	V
Gate - Emitter Voltage		V_{GE}	±10	V
Collector Current		I_C	20	A
Avalanche Energy (Single Pulse)	T_j = 25°C	E_{AS}	250	mJ
	T_j = 150°C	E_{AS} [*2]	150	mJ
Power Dissipation		P_D	107	W
Operating Junction Temperature		T_j	−40 to +175	°C
Storage Temperature		T_{stg}	−55 to +175	°C

●Thermal Resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal Resistance Junction - Case	$R_{\theta(j-c)}$	-	-	1.40	°C/W

●Electrical Characteristics (at T_j = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector - Emitter Breakdown Voltage	BV_{CES}	I_C = 2mA, V_{GE} = 0V				
		T_j = 25°C	400	430	460	V
		T_j = –40 to 175°C[*2]	395	-	465	V
Emitter - Collector Breakdown Voltage	BV_{EC}	I_C = –10mA, V_{GE} = 0V	25	35	-	V
Gate - Emitter Breakdown Voltage	BV_{GES}	I_G = ±5mA, V_{CE} = 0V	±12	-	±17	V
Collector Cut - off Current	I_{CES}	V_{CE} = 300V, V_{GE} = 0V				
		T_j = 25°C	-	-	7	μA
		T_j = 150°C[*2]	-	-	100	μA
Gate - Emitter Leakage Current	I_{GES}	V_{GE} = ±10V, V_{CE} = 0V	±0.4	±0.6	±1.2	mA
Gate - Emitter Threshold Voltage	$V_{GE(th)}$	V_{CE} = 5V, I_C = 10mA				
		T_j = 25°C	1.3	1.7	2.1	V
		T_j = 150°C	-	1.3	-	V
Collector - Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10A, V_{GE} = 5V				
		T_j = 25°C	-	1.60	2.00	V
		T_j = 150°C	-	1.80	-	V
Collector - Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 4A, V_{GE} = 4.5V				
		T_j = 25°C	-	1.17	1.50	V
		T_j = 150°C	-	1.13	-	V

●**Electrical Characteristics** (at T_j = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector - Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10A, V_{GE} = 4V				
		T_j = 25°C	-	1.70	2.10	V
		T_j = 150°C	-	1.90	-	V
Input Capacitance	C_{ies}	V_{CE} = 10V	-	1000	-	pF
Output Capacitance	C_{oes}	V_{GE} = 0V	-	175	-	
Reverse Transfer Capacitance	C_{res}	f = 1MHz	-	55	-	
Total Gate Charge	Q_g	V_{CE} = 15V, I_C = 10A, V_{GE} = 5V	-	14	-	nC
Turn - on Delay Time [*1,*2]	$t_{d(on)}$	I_C = 8A, V_{CC} = 300V, V_{GE} = 5V, R_G = 100Ω, L=5mH, T_j=25°C	0.09	0.17	0.50	μs
Rise Time [*1,*2]	t_r		0.10	0.18	0.50	
Turn - off Delay Time [*1,*2]	$t_{d(off)}$		0.8	1.3	4.0	
Fall Time [*1,*2]	t_f		1.4	2.4	6.0	
Turn - on Delay Time [*1]	$t_{d(on)}$	I_C = 8A, V_{CC} = 300V, V_{GE} = 5V, R_G = 100Ω, L=5mH, T_j=150°C	-	0.16	-	μs
Rise Time [*1]	t_r		-	0.23	-	
Turn - off Delay Time [*1]	$t_{d(off)}$		-	1.5	-	
Fall Time [*1]	t_f		-	3.9	-	
Avalanche Energy (Single Pulse)	E_{AS}	L = 5mH, V_{GE} = 5V, V_{CC} = 30V, R_G = 1kΩ,				
		T_j = 25°C	250	-	-	mJ
		T_j = 150°C [*2]	150	-	-	mJ
Gate Series Resistance	R_G		70	100	130	Ω
Gate - Emitter Resistance	R_{GE}		8	16	24	kΩ

*1) Assurance items according to our measurement definition (Fig.16)

*2) Design assurance items

●Electrical Characteristic Curves

Fig.1 Typical Output Characteristics

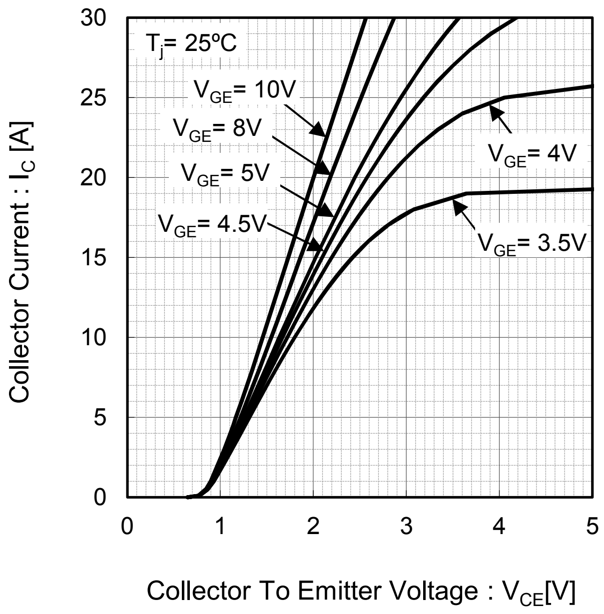


Fig.2 Typical Output Characteristics

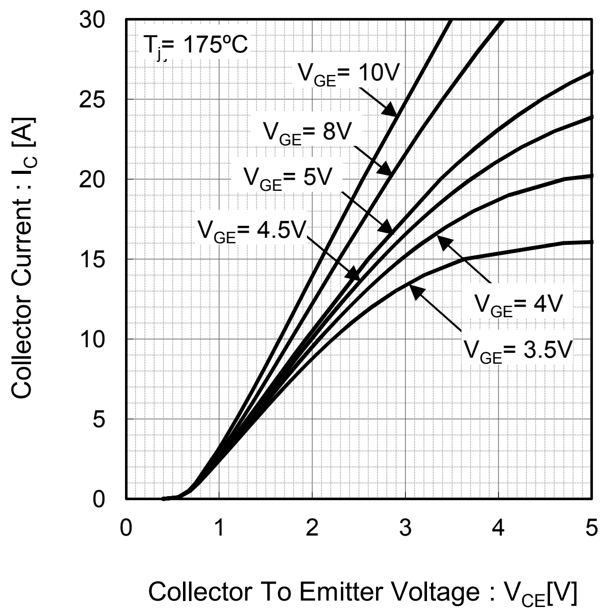


Fig.3 Typical Collector To Emitter Saturation Voltage vs. Junction Temperature

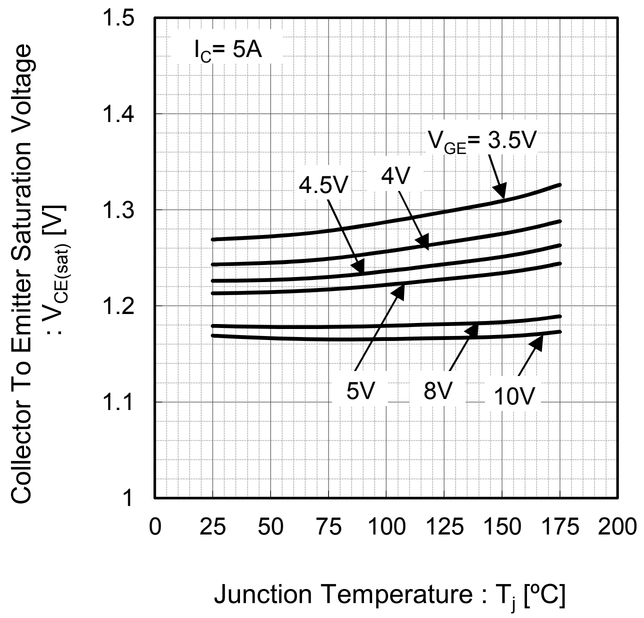
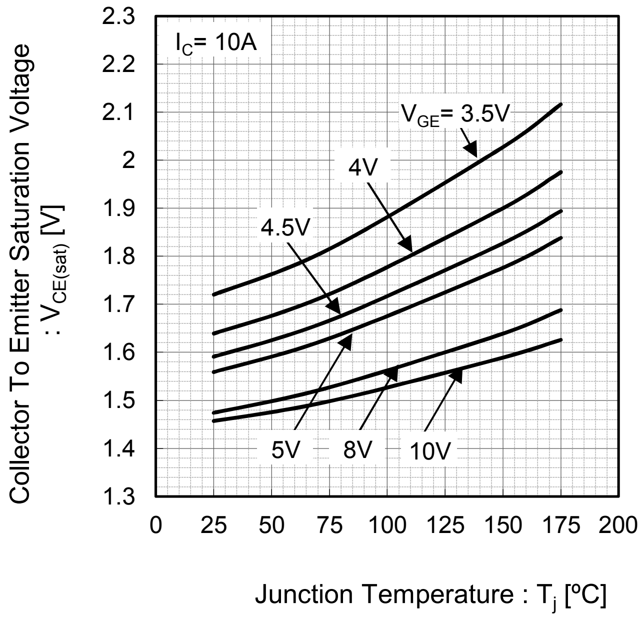


Fig.4 Typical Collector To Emitter Saturation Voltage vs. Junction Temperature



●Electrical Characteristic Curves

Fig.5 Typical Collector To Emitter Saturation Voltage vs. Junction Temperature

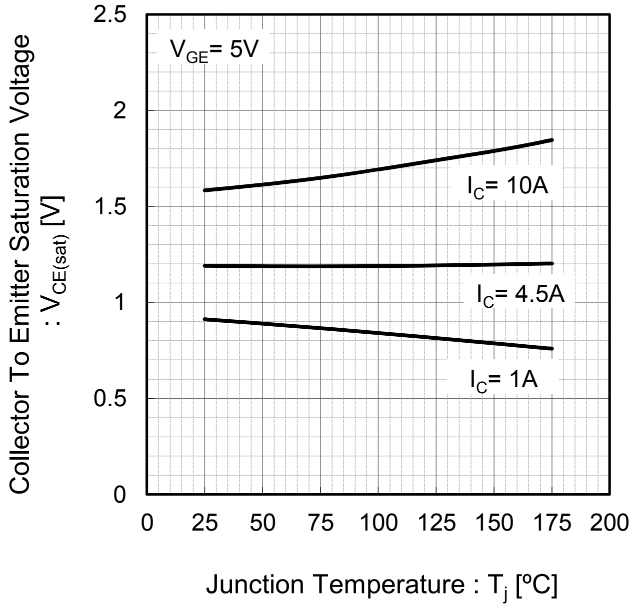


Fig.6 Typical Transfer Characteristics

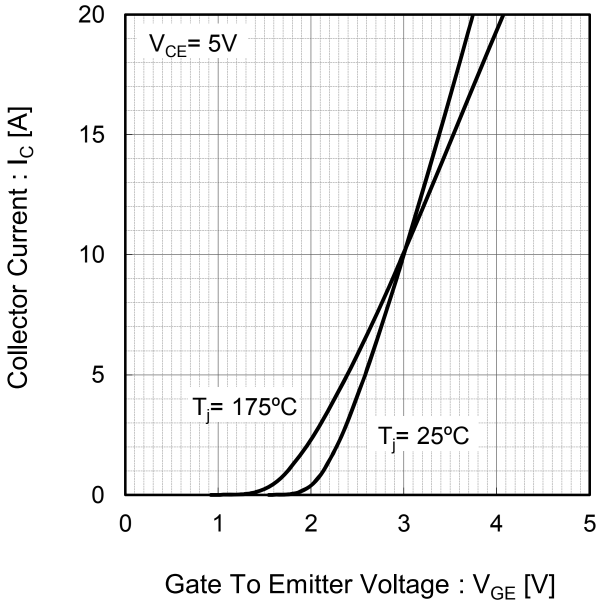


Fig.7 Typical Gate To Emitter Threshold Voltage vs. Junction Temperature

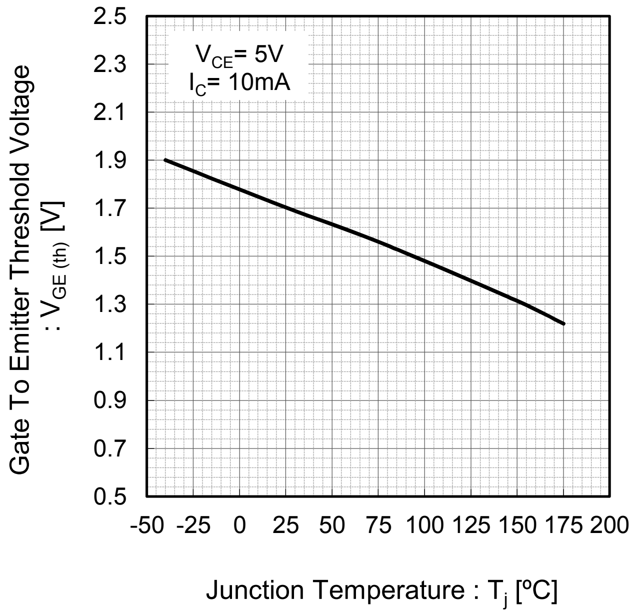
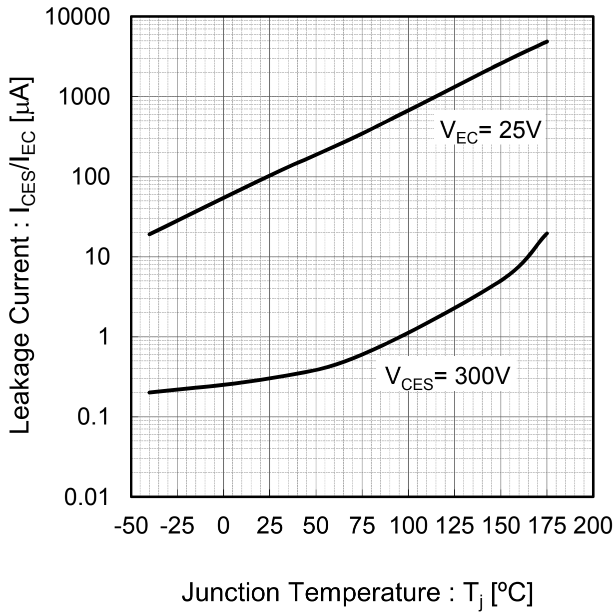


Fig.8 Typical Leakage Current vs. Junction Temperature



●Electrical Characteristic Curves

Fig.9 Typical Collector To Emitter Breakdown Voltage vs. Junction Temperature

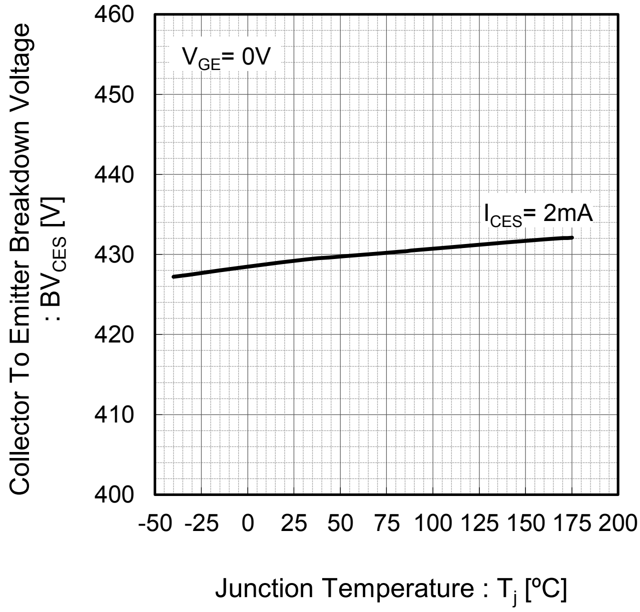


Fig.10 Typical Self Clamped Inductive Switching Current vs. Inductance

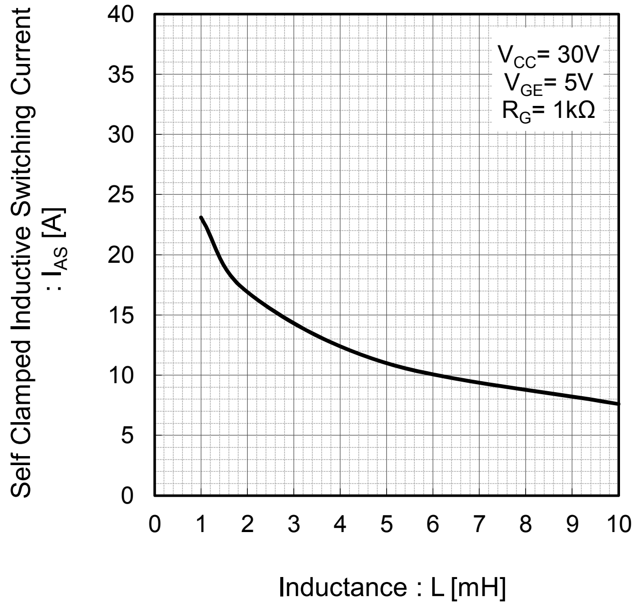


Fig.11 Typical Gate Charge

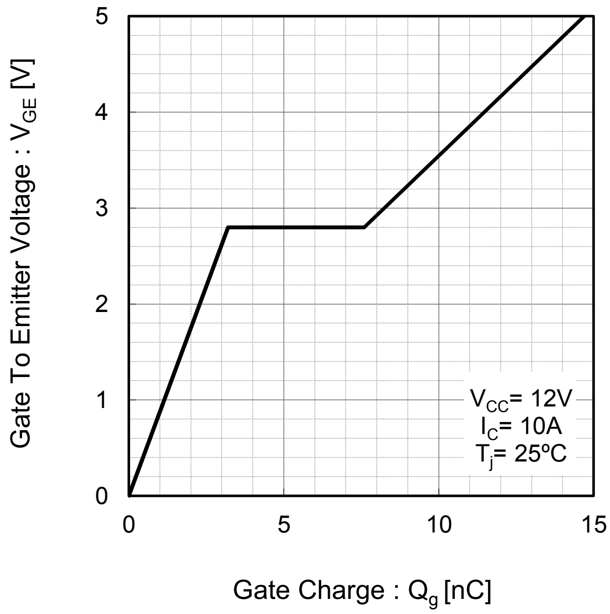
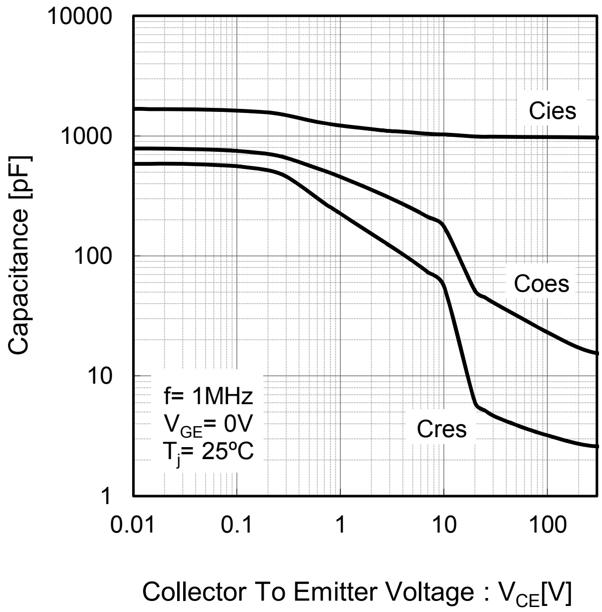


Fig.12 Typical Capacitance vs. Collector To Emitter Voltage



●Electrical Characteristic Curves

Fig.13 Typical Switching Time
vs. Junction Temperature

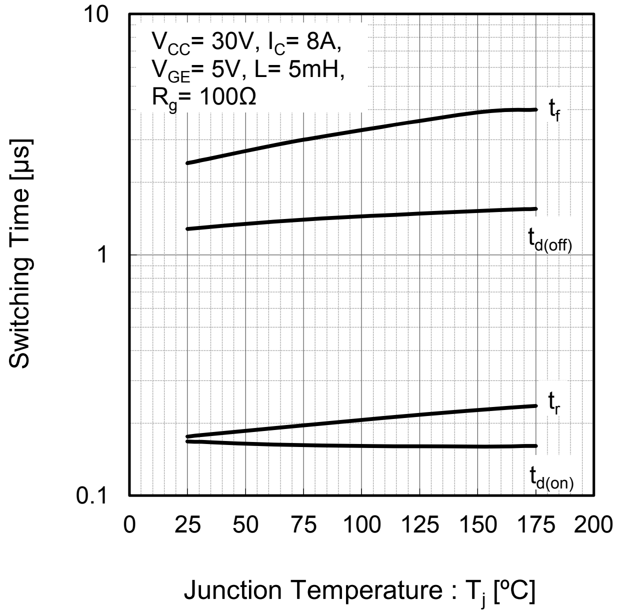
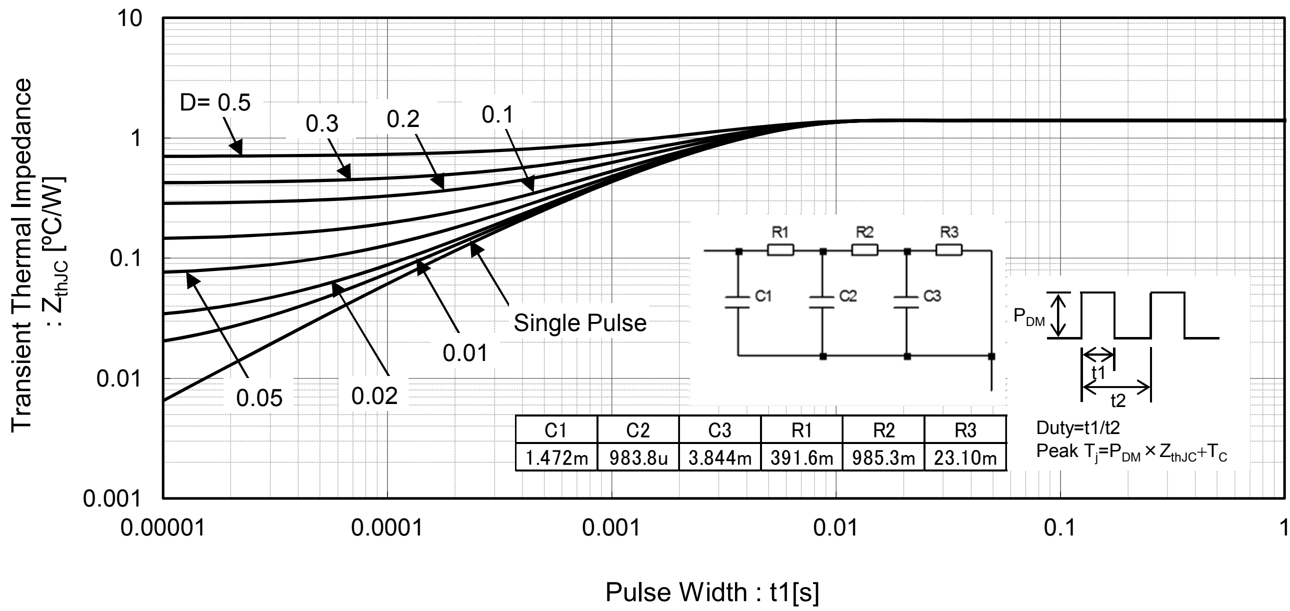


Fig.14 Transient Thermal Impedance



●Inductive Load Switching Circuit and Waveform

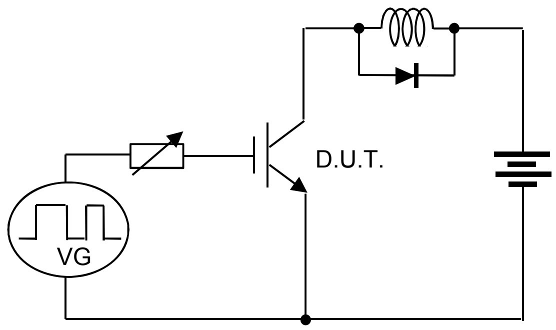


Fig.15 Inductive Load Switching Circuit

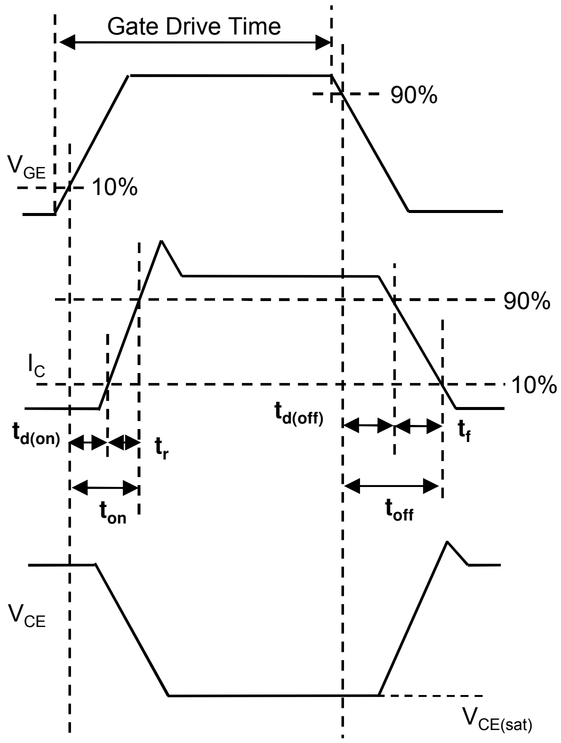


Fig.16 Inductive Load Switching Waveform

●Self Clamped Inductive Switching Circuit and Waveform

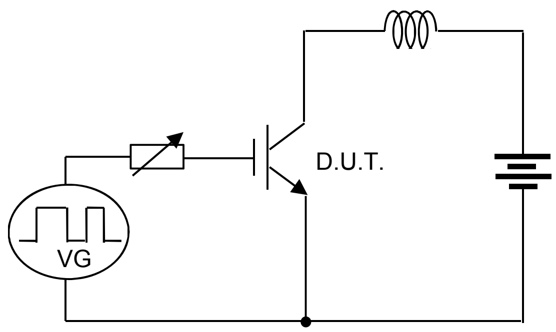


Fig.17 Self Clamped Inductive Switching Circuit

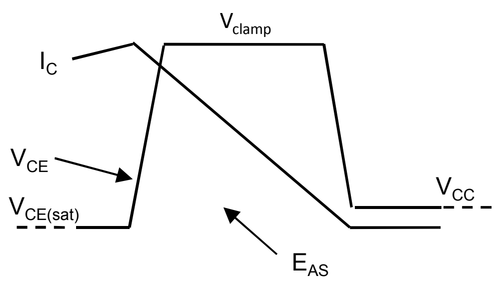


Fig.18 Self Clamped Inductive Switching Waveform

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