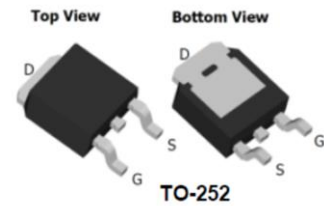
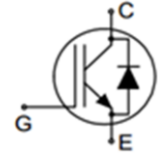


IGBT

Features

- 600V,8A
- $V_{CE(sat)(typ.)}=1.75V@V_{GE}=15V,I_C=8A$
- High speed switching and higher system efficiency
- Soft current turn-off waveforms
- Trench IGBT technology



Applications

- UPS
- General inverter
- Air condition and others home applications

Absolute Maximum Ratings ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	600	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Continuous Collector Current ($T_C=25^\circ\text{C}$)	16	A
	Continuous Collector Current ($T_C=100^\circ\text{C}$)	8	A
I_{CM}	Pulsed Collector Current (Note 1)	24	A
I_F	Diode Continuous Forward Current ($T_C=100^\circ\text{C}$)	8	A
I_{FM}	Diode Maximum Forward Current (Note 1)	24	A
t_{sc}	Short Circuit Withstand Time	10	us
P_D	Maximum Power Dissipation ($T_C=25^\circ\text{C}$)	56	W
	Maximum Power Dissipation ($T_C=100^\circ\text{C}$)	22	W
T_J	Operating Junction Temperature Range	-45 to +150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-45 to +150	$^\circ\text{C}$
TL	Maximum Temperature of Soldering	270	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j-c}$	Thermal Resistance, Junction to case for IGBT	2.2	$^\circ\text{C}/\text{W}$
$R_{th\ j-c}$	Thermal Resistance, Junction to case for Diode	5.6	$^\circ\text{C}/\text{W}$
$R_{th\ j-a}$	Thermal Resistance, Junction to Ambient	80	$^\circ\text{C}/\text{W}$

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_C=250\mu A$	600	-	-	V
I_{CES}	Collector-Emitter Leakage Current	$V_{CE}=600V, V_{GE}=0V$	-	-	20	μA
I_{GES}	Gate Leakage Current, Forward	$V_{GE}=20V, V_{CE}=0V$	-	-	200	nA
	Gate Leakage Current, Reverse	$V_{GE}=-20V, V_{CE}=0V$	-	-	-200	nA
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=250\mu A$	4.5	-	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=8A$				V
		$T_C=25^\circ\text{C}$	-	1.75	2.2	
		$T_C=125^\circ\text{C}$	-	1.95		
C_{ies}	Input Capacitance	$V_{CE}=25V$ $V_{GE}=0V$ $f=1\text{MHz}$	-	611	-	pF
C_{oes}	Output Capacitance		-	63	-	pF
C_{res}	Reverse Transfer Capacitance		-	24	-	pF
Q_g	Total Gate Charge		-	32		nC
Q_{ge}	Gate-Emitter Charge	$V_{CC}=480V$ $V_{GE}=15V$ $I_C=8A$	-	4.5		nC
Q_{gc}	Gate-Collector Charge		-	27.5		nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=400V$ $V_{GE}=15V$ $I_C=8A$ $R_G=10\Omega$ Inductive Load $T_C=25^\circ\text{C}$	-	7	-	ns
t_r	Turn-on Rise Time		-	23	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	48	-	ns
t_f	Turn-off Fall Time		-	79	-	ns
E_{on}	Turn-on Switching Loss		-	0.15	-	mJ
E_{off}	Turn-off Switching Loss		-	0.17	-	mJ
E_{ts}	Total Switching Loss		-	0.32	-	mJ

Electrical Characteristics of Diode ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=8A$	-	1.4	1.9	V
t_{rr}	Diode Reverse Recovery Time	$V_{CE}=300V$ $I_F=8A$ $di_F/dt=100A/\mu s$	-	47		ns
I_{rr}	Diode peak Reverse Recovery Current		-	7		A
Q_{rr}	Diode Reverse Recovery Charge		-	176		nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Performance Characteristics

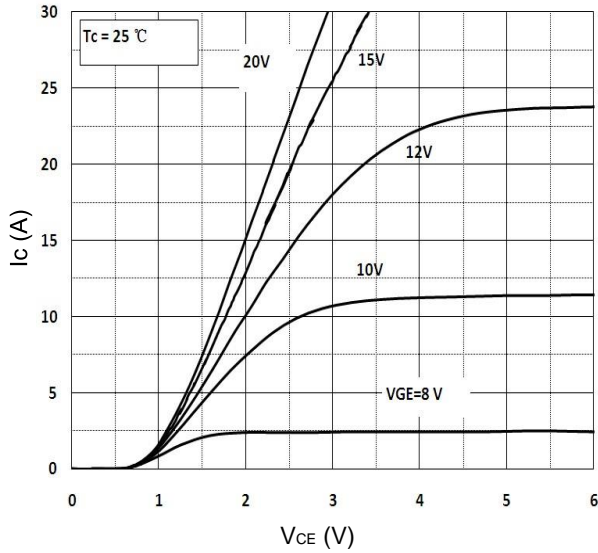


Figure 1. typical output characteristics

$T_c=25^\circ\text{C}$ $t_p=300\mu\text{s}$

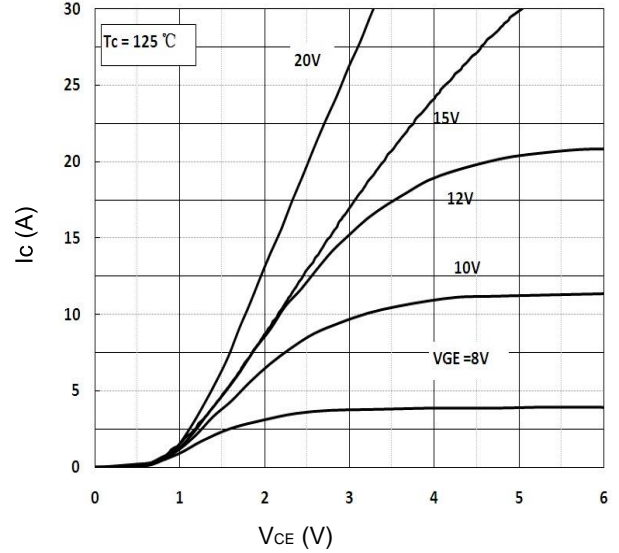


Figure 2. typical output characteristics

$T_c=125^\circ\text{C}$ $t_p=300\mu\text{s}$

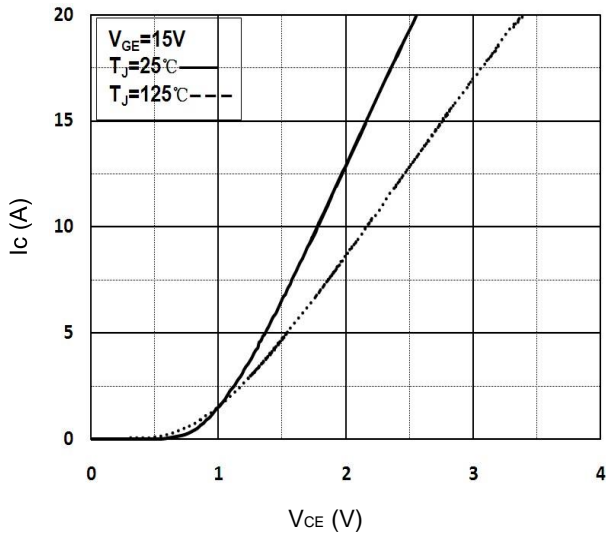


Figure 3. typical V_{ce} saturation voltage characteristics

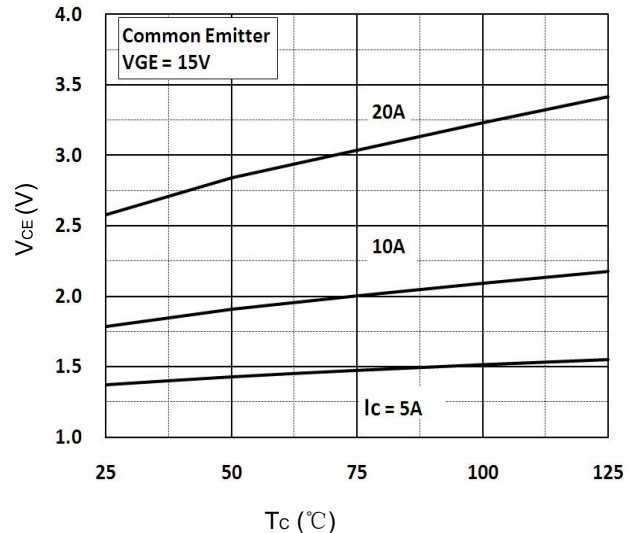


Figure 4. typical V_{ce} saturation voltage characteristics with various case temperature

Typical Performance Characteristics

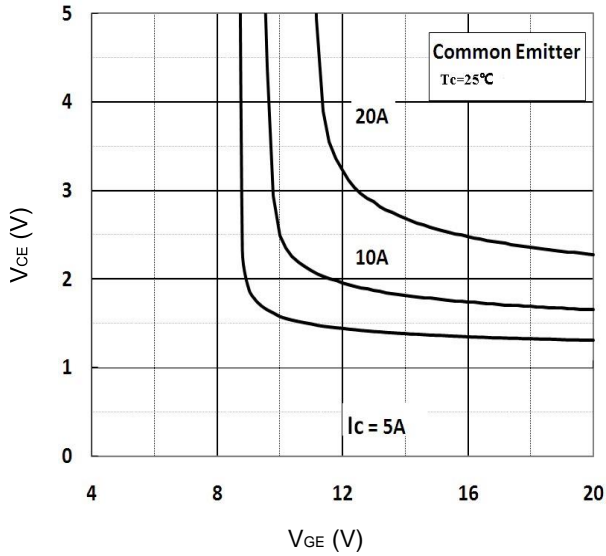


Figure 5. typical V_{CE} saturation voltage characteristics with various V_{GE}

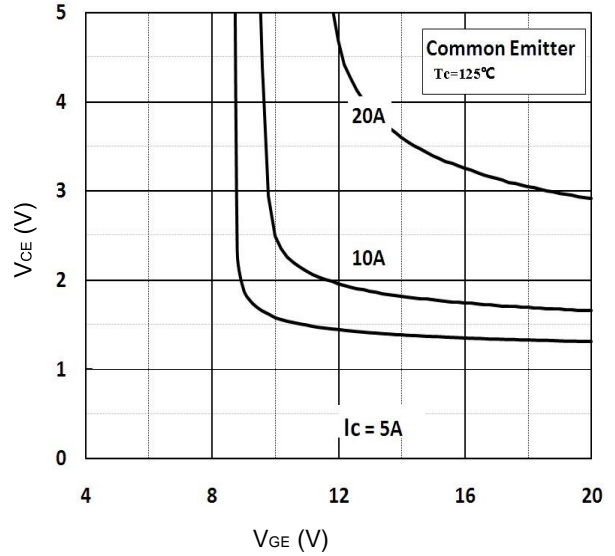


Figure 6. typical V_{CE} saturation voltage characteristics with various V_{GE}

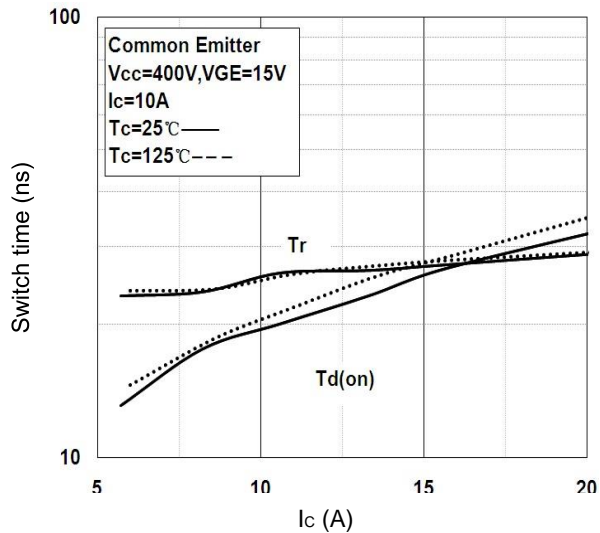


Figure 7. switch on time – I_C characteristics

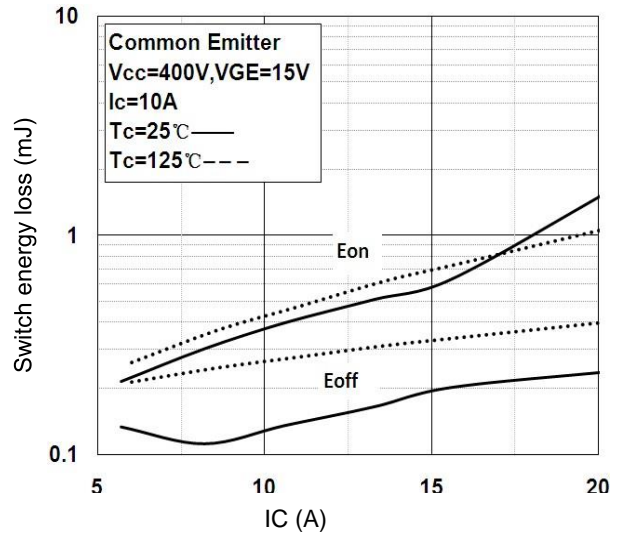


Figure 8. switch energy loss – I_C characteristics

Typical Performance Characteristics

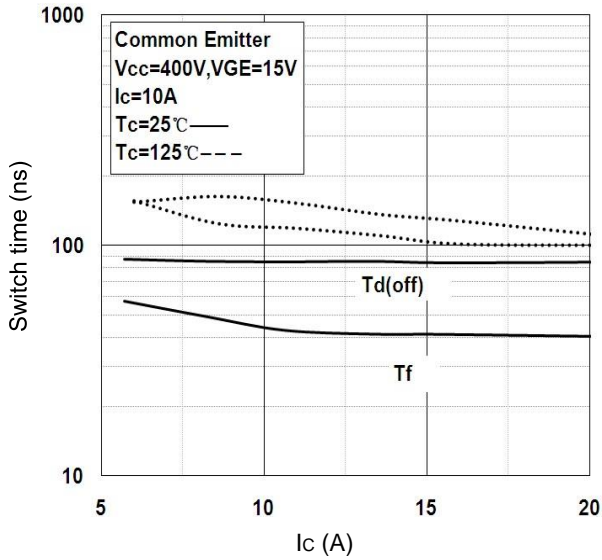


Figure 9. switch off time - I_C characteristics

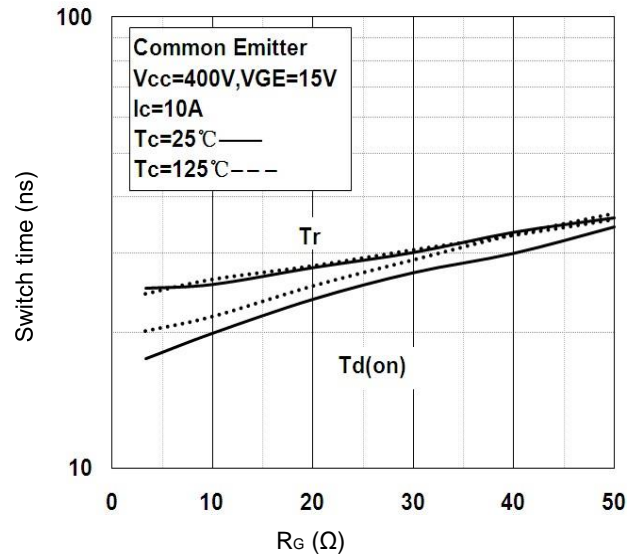


Figure 10. switch off time - R_G characteristics

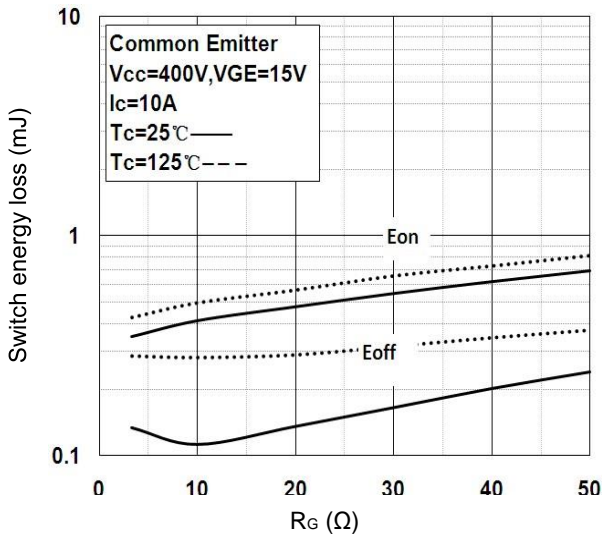


Figure 11. switch energy loss - R_G characteristics

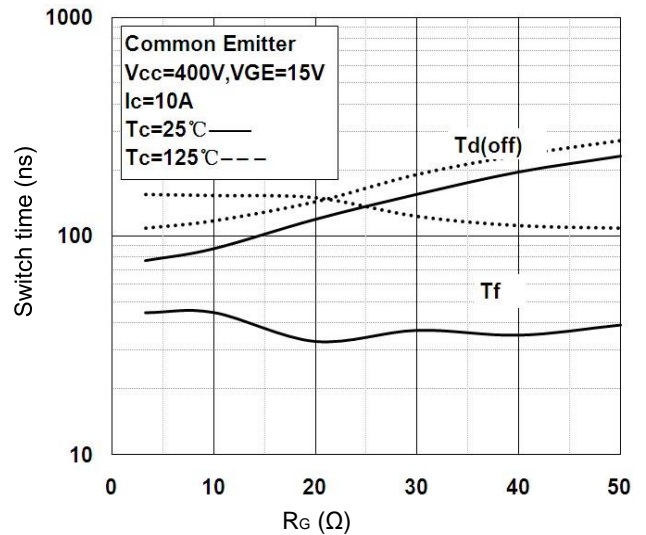


Figure 12. switch off time - R_G characteristics

Typical Performance Characteristics

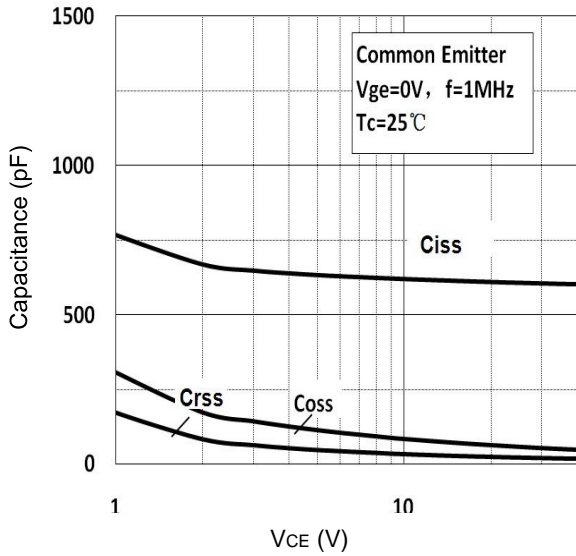


Figure 13. capacitance with various Vce

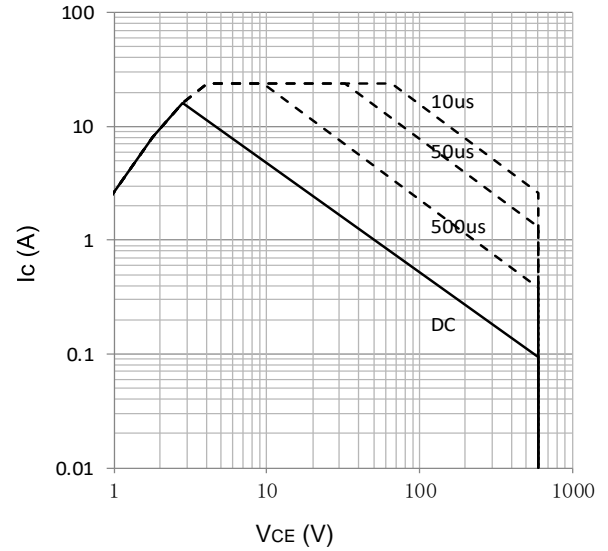


Figure 14. safe operation area (SOA)

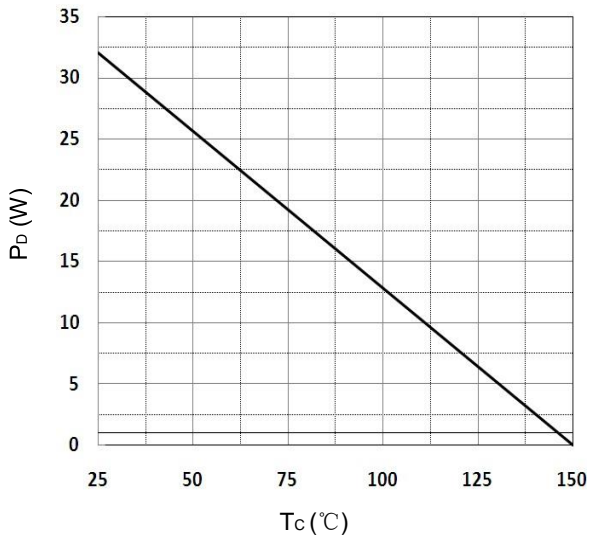


Figure 15. dissipation power loss – case temperature

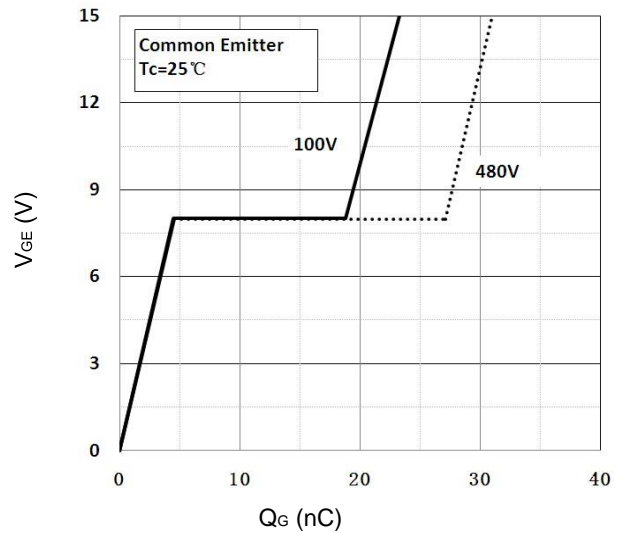


Figure 16. gate charge characteristics

Typical Performance Characteristics

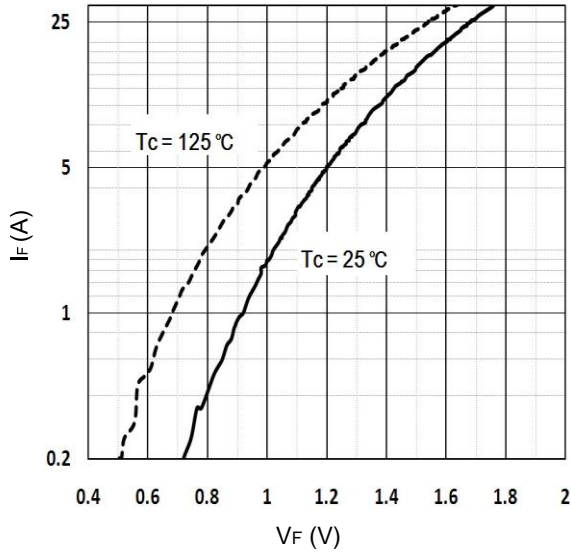


Figure 17. typical diode forward voltage characteristics

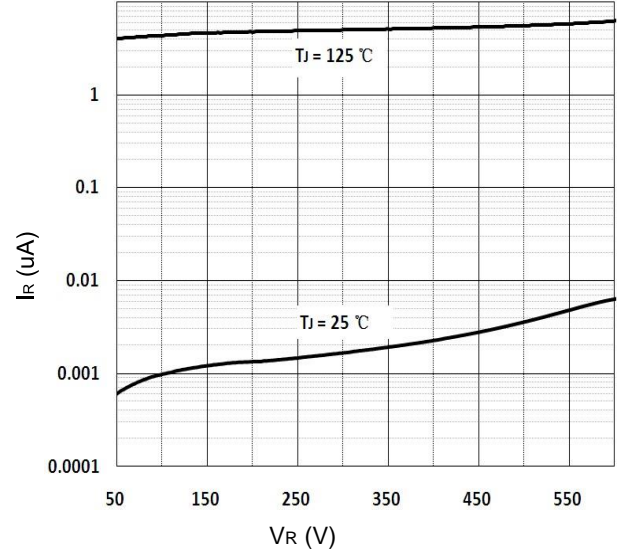


Figure 18. typical diode reverse leakage current

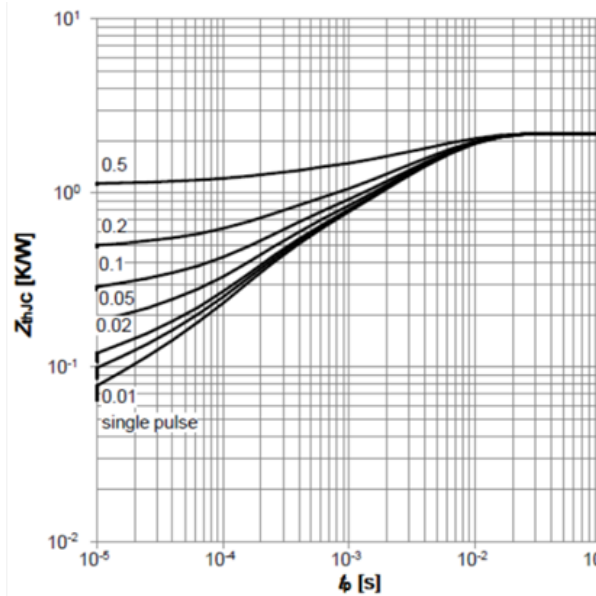


Figure 19. IGBT transient thermal resistance

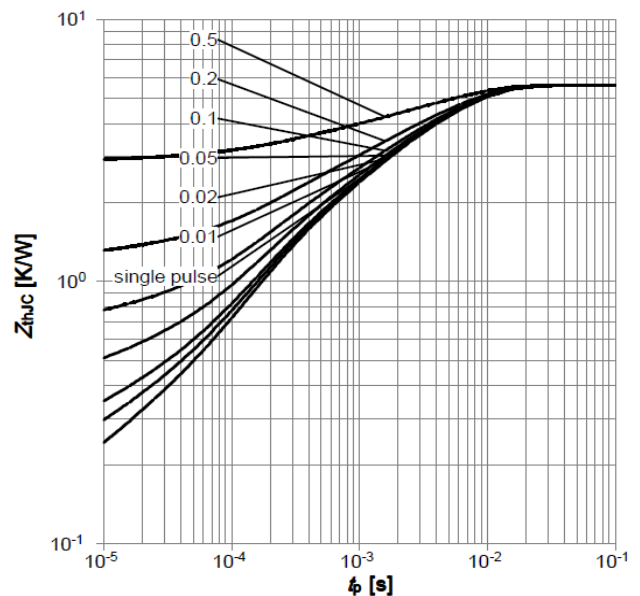
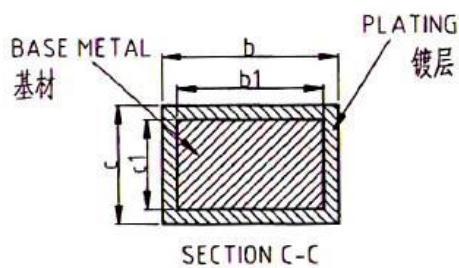
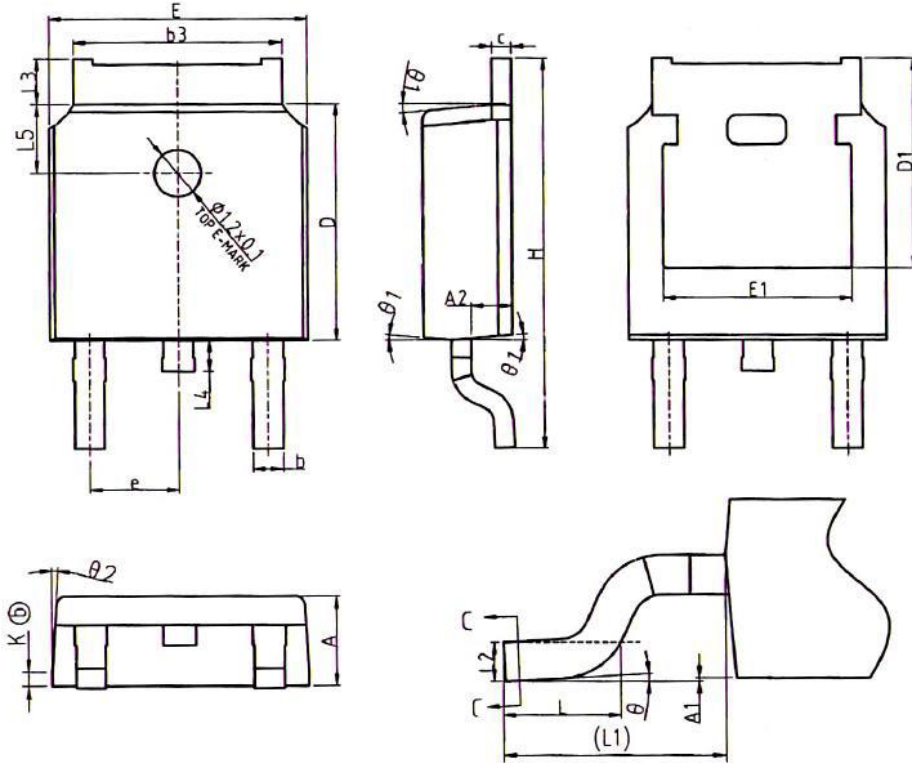


Figure 20. FRD transient thermal resistance

Mechanical Dimensions



COMMON DIMENSIONS

SYMBOL	MM		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.10
A2	0.97	1.07	1.17
b	0.72	0.78	0.85
b1	0.71	0.76	0.81
b3	5.23	5.33	5.46
c	0.47	0.53	0.58
c1	0.46	0.51	0.56
D	6.00	6.10	6.20
D1	5.30REF		
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e	2.286BSC		
H	9.90	10.10	10.30
L	1.40	1.50	1.70
L1	2.90REF		
L2	0.51BSC		
L3	0.90	-	1.25
L4	0.60	0.80	1.00
L5	1.70	1.80	1.90
θ	0°	-	8°
$\theta 1$	5°	7°	9°
$\theta 2$	5°	7°	9°
K	0.40REF		

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