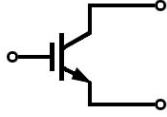
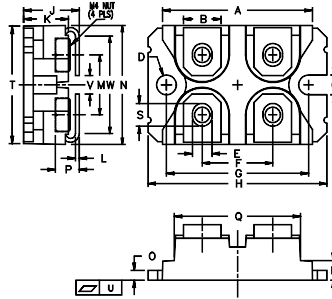


SG75S12S

Discrete IGBTs



Dimensions SOT-227(ISOTOP)



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	0.031	0.033

	I _C A	V _{CE} V
SG75S12S	75	1200

Maximum Rated Values

(T_{vj} = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions	Values	Unit
Collector-Emitter Voltage	V _{CES}	V _{GE} shorted	1200	V
DC Collector Current	I _C	T _{hs} = 70°C	75	A
Peak Collector Current	I _{CM}	Pulse: t _p = 1ms, T _{hs} = 70°C	150	A
Gate Emitter Voltage	V _{GES}		±20	V
Total Power Dissipation	P _{tot}	T _{hs} = 25°C per switch	340	W
IGBT Switching SOA	SwSOA	I _C = 150A, V _{CEM} = 1200V, V _{CC} ≤ 1000V, V _{GE} = ±15V, T _{vj} = 125°C voltages measured on auxiliary terminals		
IGBT Short Circuit SOA	SCSOA	V _{CC} = 900V, V _{CEM} = 1200V, t _p = 10μs, V _{GE} = ±15V, T _{vj} = 125°C		
DC Forward Current	I _F		75	A
Peak Forward Current	I _{FM}	Pulse: t _p = 1ms, T _{hs} = 70°C	150	A

Maximum Rated Values (cont.)

(T_{vj} = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions	Values	Unit
Junction Temperature	T _{vj}		-40 ~ 150	°C
Storage Temperature	T _{tstg} / T _{cop}		-40 ~ 125	°C
Isolation Voltage	V _{iso}	1min, f = 50Hz	2500	V

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Discrete IGBTs

IGBT Characteristic Values ($T_{vj} = 25^{\circ}\text{C}$, unless specified otherwise)

Parameter	Sybmol	Conditions	min.	typ.	max.	Unit
Collector-Emitter Saturation Voltage	$V_{CE(sat)}^*$	$I_C = 75\text{A}, V_{GE} = 15\text{V}$	$T_{vj} = 25^{\circ}\text{C}$	2.00	2.35	V
			$T_{vj} = 125^{\circ}\text{C}$	2.20		V
Collector Cut-off Current	I_{CES}	$V_{CE} = 1200\text{V}, V_{GE} = 0\text{V}, T_{vj} = 125^{\circ}\text{C}$			6	mA
Gate-Emitter leakage Current	I_{GES}	$V_{CE} = 0\text{V}, V_{GE} = \pm 20\text{V}, T_{vj} = 125^{\circ}\text{C}$			± 500	nA
Gate-Emitter Threshold Voltage	$V_{GE(TO)}$	$I_C = 3\text{mA}, V_{CE} = V_{GE}$	4.5		6.5	V
Total Gate Charge	Q_{ge}	$I_C = 75\text{A}, V_{CE} = 600\text{V}, V_{GE} = -15 \text{ to } 15\text{V}$		750		nC
Input Capacitance	C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		6.5		nF
Output Capacitance	C_{oes}			1.6		nF
Reverse Transfer Capacitance	C_{res}			1.4		nF
Turn-On Delay Time	$t_{d(on)}$		$I_C = 75\text{A}, V_{CC} = 600\text{V}, R_{gon} = 15\Omega,$ $T_{vj} = 125^{\circ}\text{C}, V_{GE} = \pm 15\text{V}$		0.1	
Rise Time	t_r			0.05		μs
Turn-Off Delay Time	$t_{d(off)}$	$I_C = 75\text{A}, V_{CC} = 600\text{V}, R_{goff} = 15\Omega,$ $T_{vj} = 125^{\circ}\text{C}, V_{GE} = \pm 15\text{V}$		0.50		μs
Fall Time	t_f			0.09		μs
Turn-on Switching Energy	E_{on}	$R_{gon} = 15\Omega$ $I_C = 75\text{A}, T_{vj} = 125^{\circ}\text{C},$ $V_{CC} = 600\text{V}, V_{GE} = \pm 15\text{V},$ inductive load, integrated up to: 3% V_{CE} (E_{on}), 1% I_C (E_{off})		8.5		mJ
	E_{off}		$R_{goff} = 15\Omega$		7.0	
Module stray Inductance Plus to Minus	L_{sDC}				25	nH
Resistance terminal-chip	R_{CC+EE}	$T_{hs} = 25^{\circ}\text{C}$		1.25		m Ω
		$T_{hs} = 125^{\circ}\text{C}$		1.90		

* Note 1: Collector emitter saturation voltage is given at die level.

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Discrete IGBTs

Diode Characteristic Values ($T_j = 25^\circ\text{C}$, unless specified otherwise)

Parameter	Symbol	Conditions	min.	typ.	max.	Unit	
Forward Voltage	V_F^*	$I_F = 75\text{A}$	$T_{vj} = 25^\circ\text{C}$		2.00	2.40	V
			$T_{vj} = 125^\circ\text{C}$		2.00		
Reverse Recovery Current	I_{rrm}	$I_F = 75\text{A}$, $R_{gon} = 15\Omega$, $V_{CC} = 600\text{V}$, $V_{GE} = \pm 15\text{V}$, $T_{vj} = 125^\circ\text{C}$		75		A	
Reverse Recovery Charge	Q_{rr}				14	μC	
Reverse Recovery Time	t_{rr}				0.35	μs	
Reverse Recovery Energy	E_{rec}	$I_F = 75\text{A}$, $T_{vj} = 125^\circ\text{C}$, $V_{CC} = 600\text{V}$, $R_{gon} = 15\Omega$, $V_{GE} = \pm 15\text{V}$, inductive load, fully integrated		5.5		mJ	
Resistance terminal-chip	$R_{CC'+EE'}$		$T_{hs} = 25^\circ\text{C}$		1.25	m Ω	
			$T_{hs} = 125^\circ\text{C}$		1.90		

* Note 2: Forward voltage is given at die level

Thermal Characteristics ($T_j = 25^\circ\text{C}$, unless specified otherwise)

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
IGBT Thermal Resistance Junction to Heatsink	$R_{th\ j-h\ IGBT}$	Heatsink: flatness $< \pm 20\mu\text{m}$, roughness $< 6\mu\text{m}$ without ridge Thermal grease: thickness: $30\mu\text{m} < t < 50\mu\text{m}$			0.370	$^\circ\text{C/W}$
Diode Thermal Resistance Junction to Heatsink	$R_{th\ j-h\ Diode}$				0.740	$^\circ\text{C/W}$
Equivalent IGBT Thermal Resistance Junct. to Case	$R_{th\ j-c\ IGBT}$				0.235	$^\circ\text{C/W}$
Equivalent Diode Thermal Resistance Junct. to Case	$R_{th\ j-c\ Diode}$				0.550	$^\circ\text{C/W}$

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Discrete IGBTs

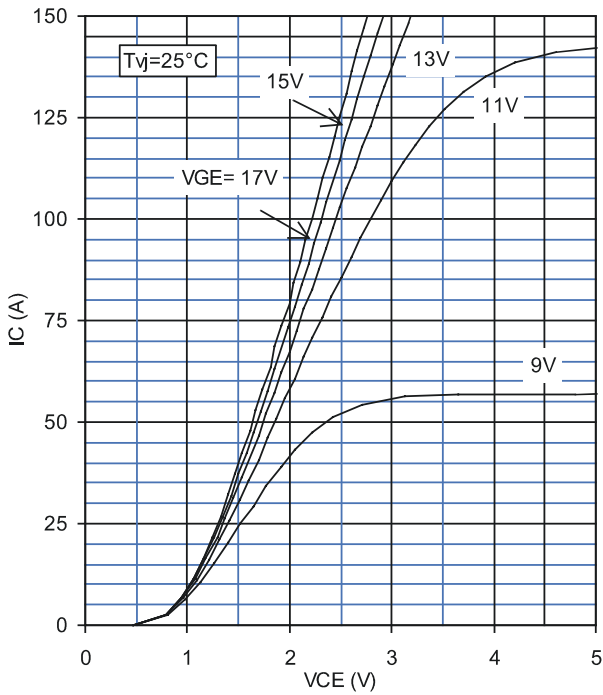


Fig. 1 Typ. Output Characteristics at $T_{vj}=25^{\circ}\text{C}$

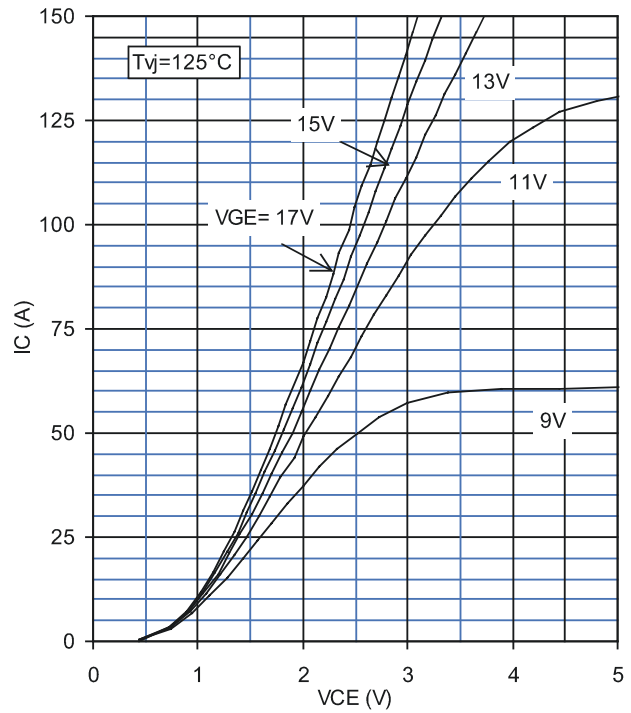


Fig. 2 Typ. Output Characteristics at $T_{vj}=125^{\circ}\text{C}$

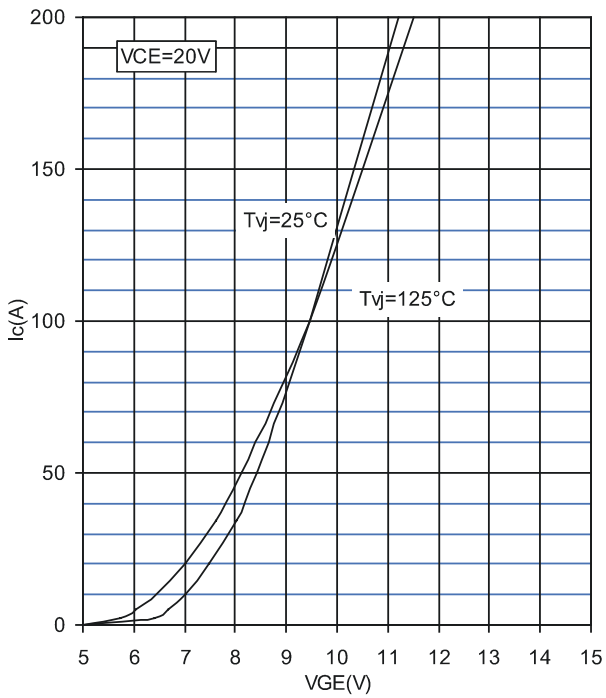


Fig. 3 Typ. Transfer Characteristics

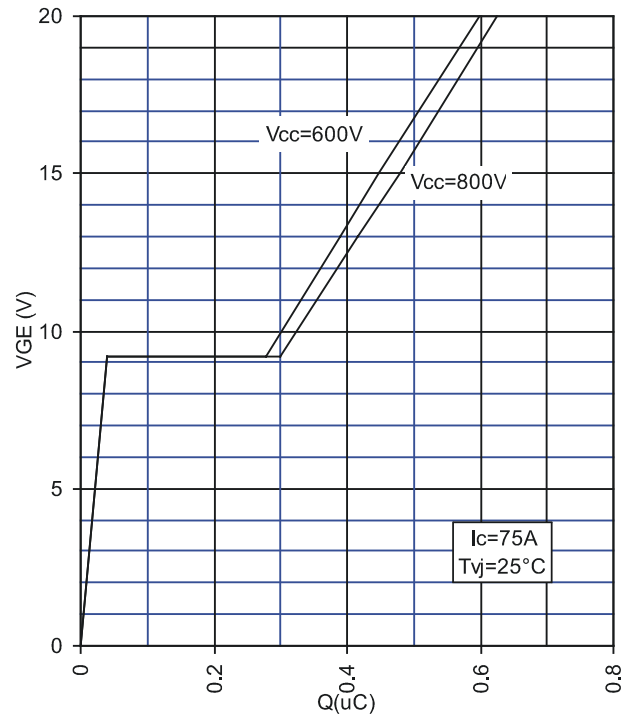


Fig. 4 Typ. Gate charge Characteristi

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Discrete IGBTs

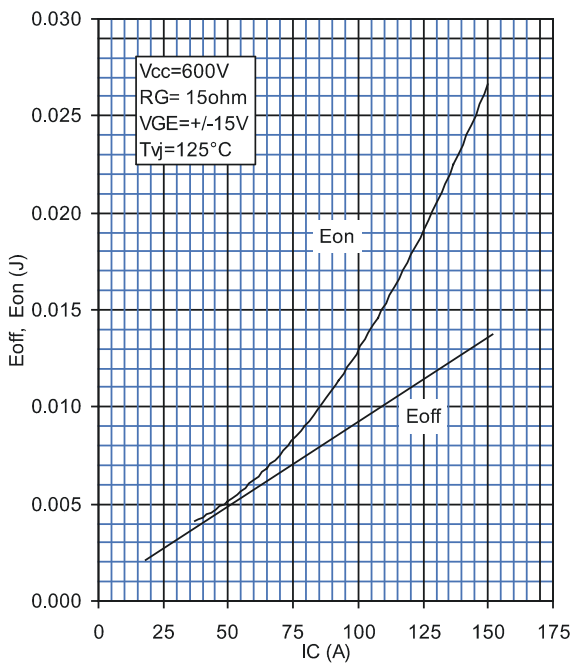


Fig. 5 Typ. Switching Energies per pulse vs on-state current

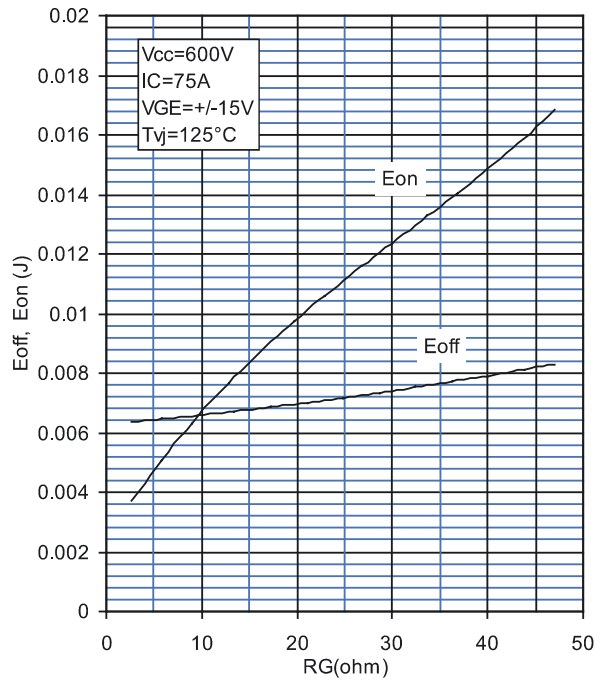


Fig. 6 Typ. Switching Energies per pulse v gate resistor

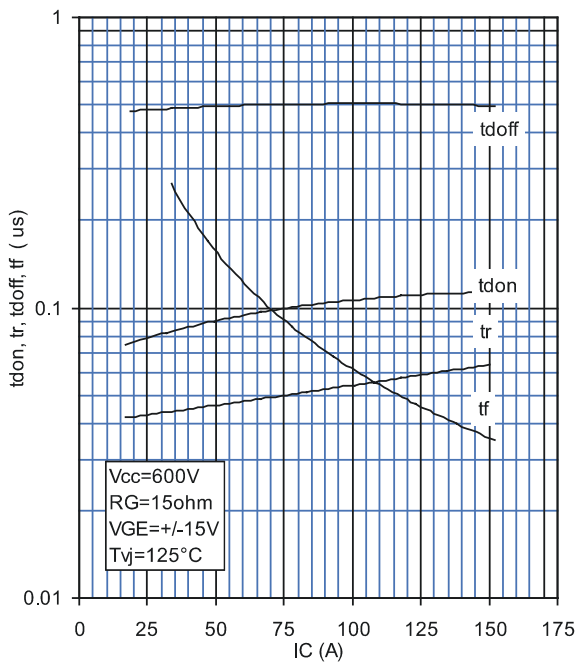


Fig. 7 Typ. Switching times vs on-state current

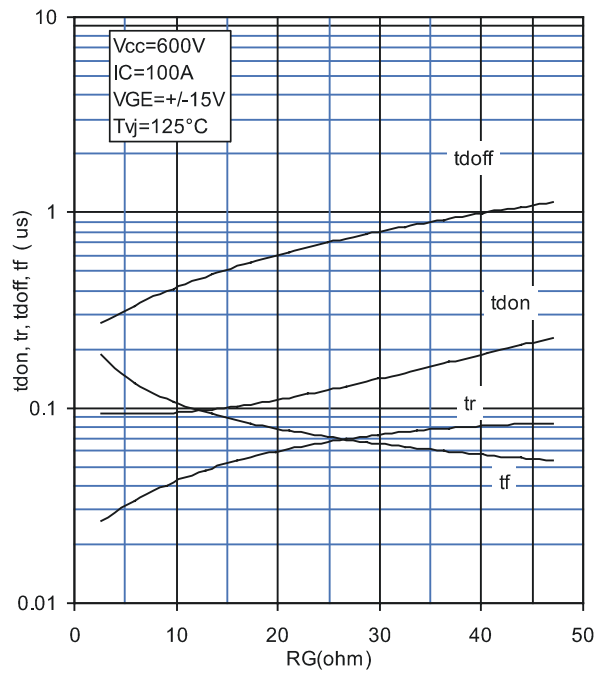


Fig. 8 Typ. Switching times vs gate resistor

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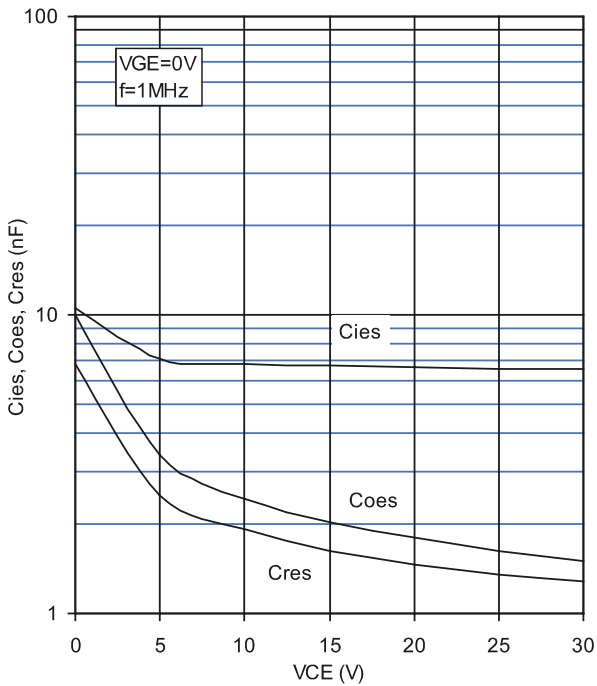


Fig. 9 Typ. Capacitances vs collector-emitter Voltage

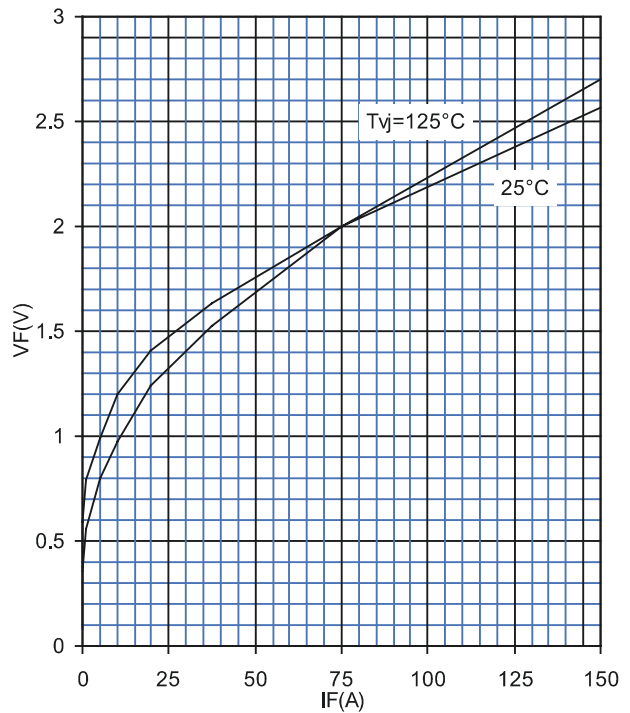


Fig. 10 Typ. Diode forward Characteristics

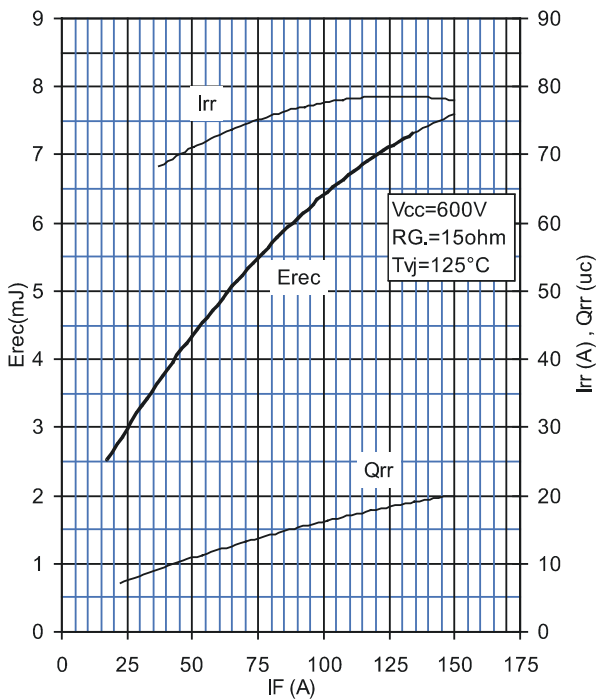


Fig. 11 Typ. Reverse Recovery Characteristics vs forward current

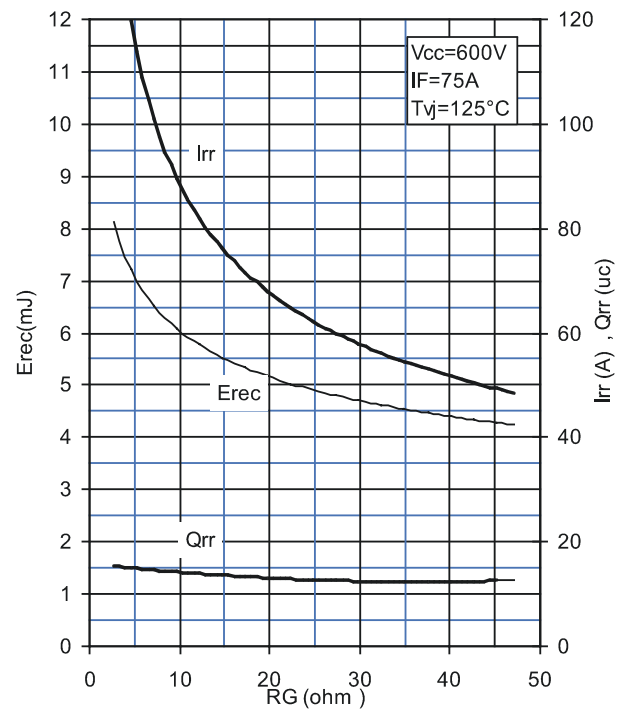


Fig. 12 Typ. Reverse Recovery Characteristics vs gate resistor

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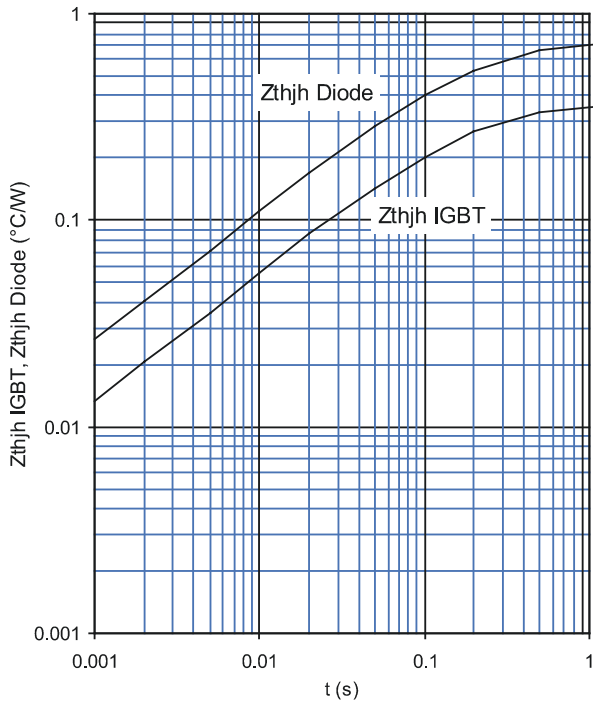


Fig. 13 Typ. Thermal impedance vs time