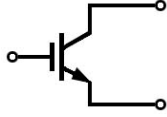
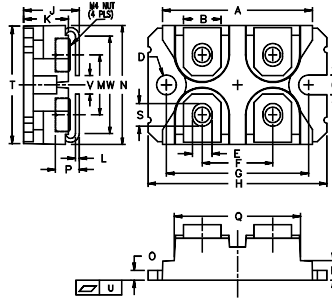


# SG75S12S

## 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 <sub>C</sub> A	V <sub>CE</sub> V
<b>SG75S12S</b>	75	1200

### Maximum Rated Values

(T<sub>vj</sub> = 25°C, unless specified otherwise)

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

### Maximum Rated Values (cont.)

(T<sub>vj</sub> = 25°C, unless specified otherwise)

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

# SG75S12S

## 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	$I_{GES}$	$V_{CE} = 0\text{V}, V_{GE} = \pm 20\text{V}, T_{vj} = 125^{\circ}\text{C}$			$\pm 500$	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		$\mu\text{s}$
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		$\mu\text{s}$
Fall Time	$t_f$			0.09		$\mu\text{s}$
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 $\Omega$
		$T_{hs} = 125^{\circ}\text{C}$		1.90		

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

# SG75S12S

## Discrete IGBTs

### Diode Characteristic Values (T<sub>j</sub> = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions	min.	typ.	max.	Unit	
Forward Voltage	V <sub>F</sub> *	I <sub>F</sub> = 75A		2.00	2.40	V	
					2.00		
Reverse Recovery Current	I <sub>rrm</sub>	I <sub>F</sub> = 75A, R <sub>gon</sub> = 15Ω, V <sub>CC</sub> = 600V, V <sub>GE</sub> = ±15V, T <sub>vj</sub> = 125°C		75		A	
Reverse Recovery Charge	Q <sub>rr</sub>				14		μC
Reverse Recovery Time	t <sub>rr</sub>				0.35		μs
Reverse Recovery Energy	E <sub>rec</sub>	I <sub>F</sub> = 75A, T <sub>vj</sub> = 125°C, V <sub>CC</sub> = 600V, R <sub>gon</sub> = 15Ω, V <sub>GE</sub> = ±15V, inductive load, fully integrated		5.5		mJ	
Resistance terminal-chip	R <sub>CC'+EE'</sub>			1.25		mΩ	
				1.90			

\* Note 2: Forward voltage is given at die level

### Thermal Characteristics (T<sub>j</sub> = 25°C, unless specified otherwise)

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
IGBT Thermal Resistance Junction to Heatsink	R <sub>th j-h IGBT</sub>	Heatsink: flatness < +/-20μm, roughness < 6μm without ridge Thermal grease: thickness: 30μm < t < 50μm			0.370	°C/W
Diode Thermal Resistance Junction to Heatsink	R <sub>th j-h Diode</sub>				0.740	°C/W
Equivalent IGBT Thermal Resistance Junct. to Case	R <sub>th j-c IGBT</sub>				0.235	°C/W
Equivalent Diode Thermal Resistance Junct. to Case	R <sub>th j-c Diode</sub>				0.550	°C/W

# SG75S12S

## Discrete IGBTs

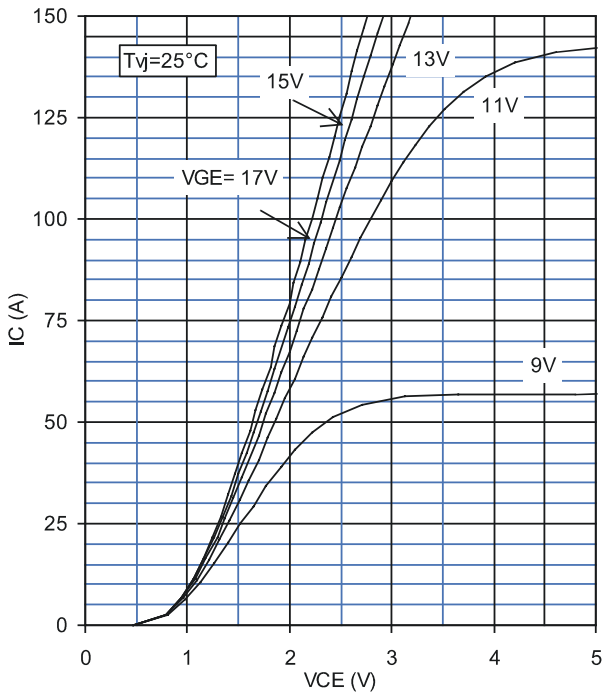


Fig. 1 Typ. Output Characteristics at  $T_{vj}=25^{\circ}\text{C}$

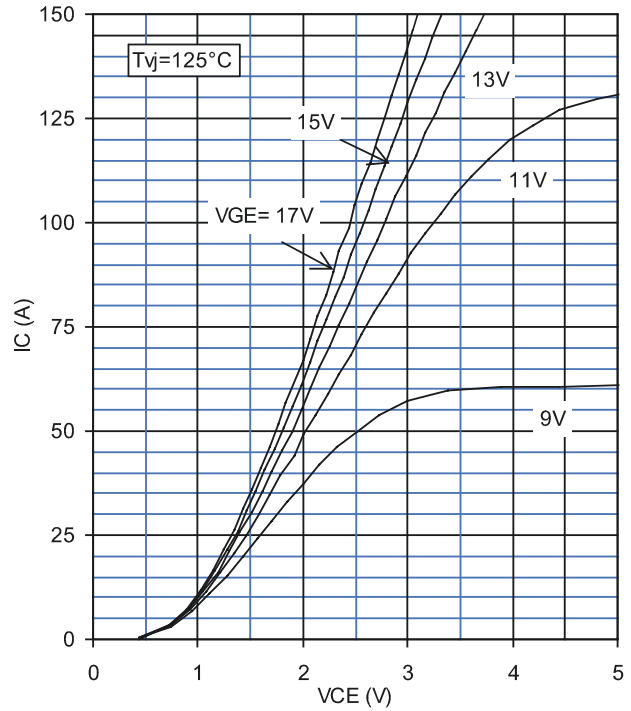


Fig. 2 Typ. Output Characteristics at  $T_{vj}=125^{\circ}\text{C}$

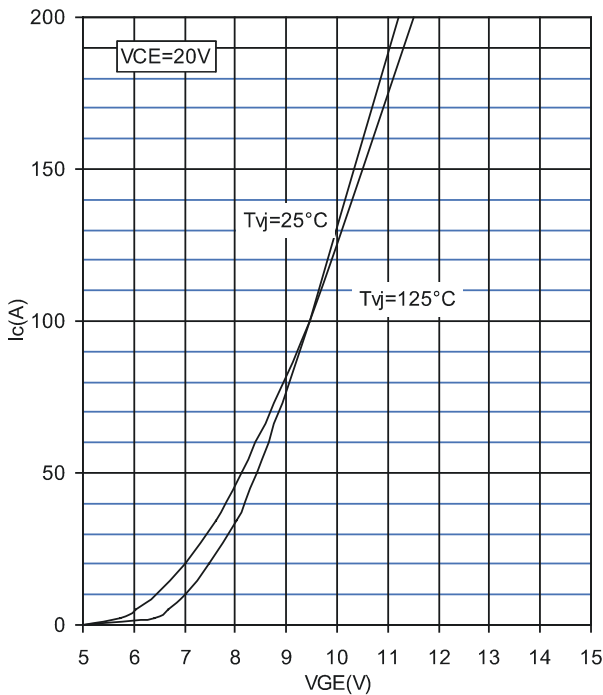


Fig. 3 Typ. Transfer Characteristics

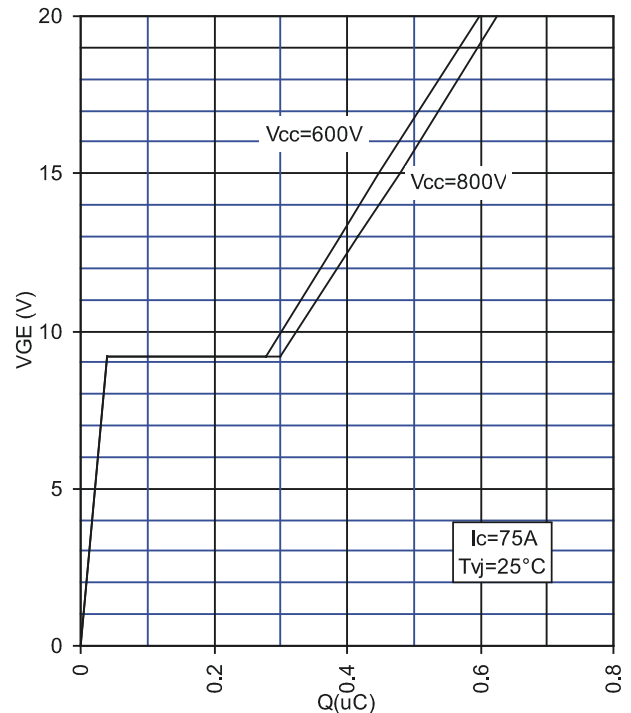


Fig. 4 Typ. Gate charge Characteristi

# SG75S12S

## Discrete IGBTs

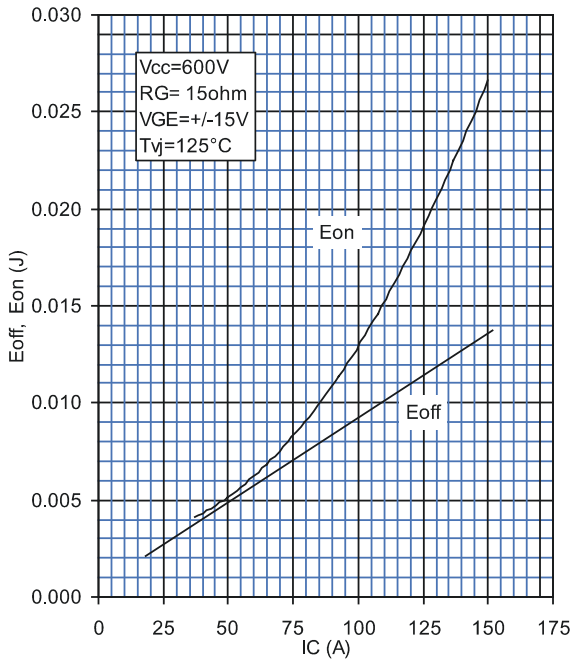


Fig. 5 Typ. Switching Energies per pulse vs on-state current

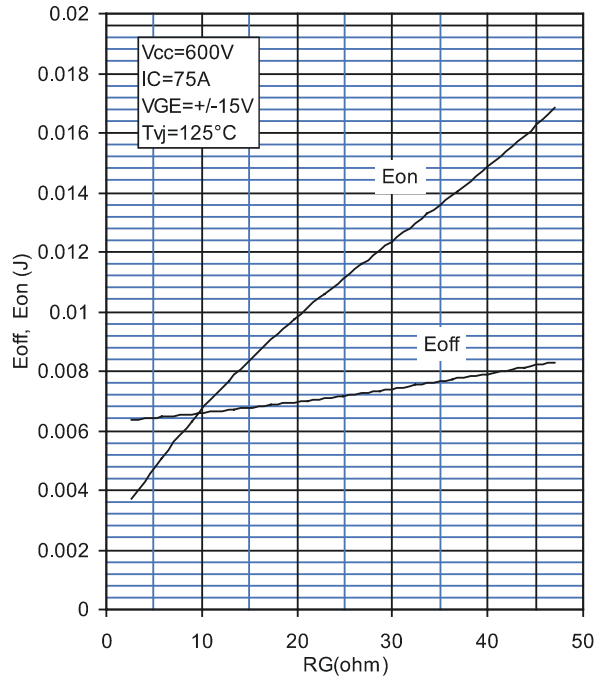


Fig. 6 Typ. Switching Energies per pulse v gate resistor

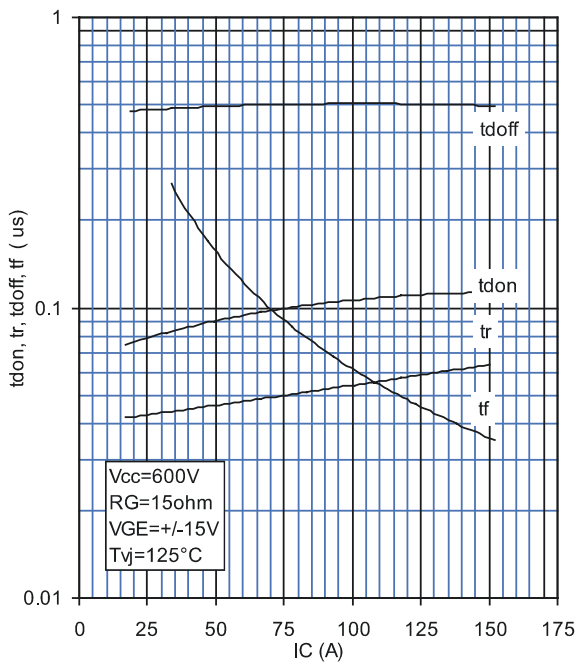


Fig. 7 Typ. Switching times vs on-state current

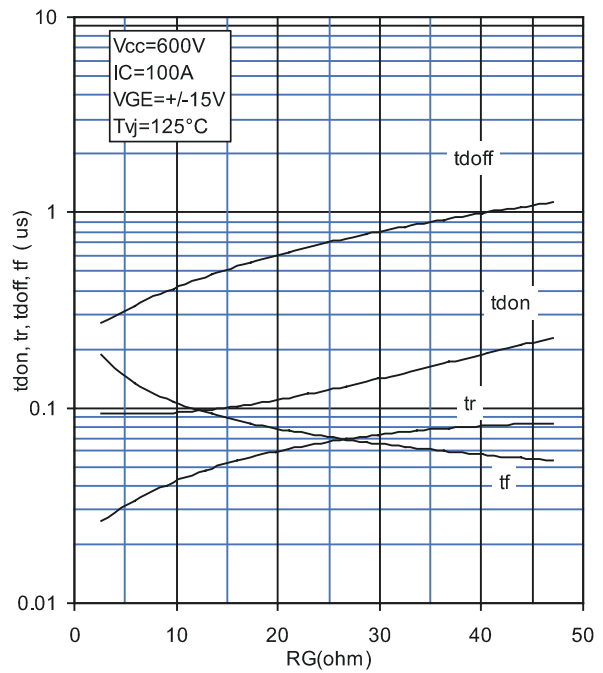


Fig. 8 Typ. Switching times vs gate resistor

# SG75S12S

## Discrete IGBTs

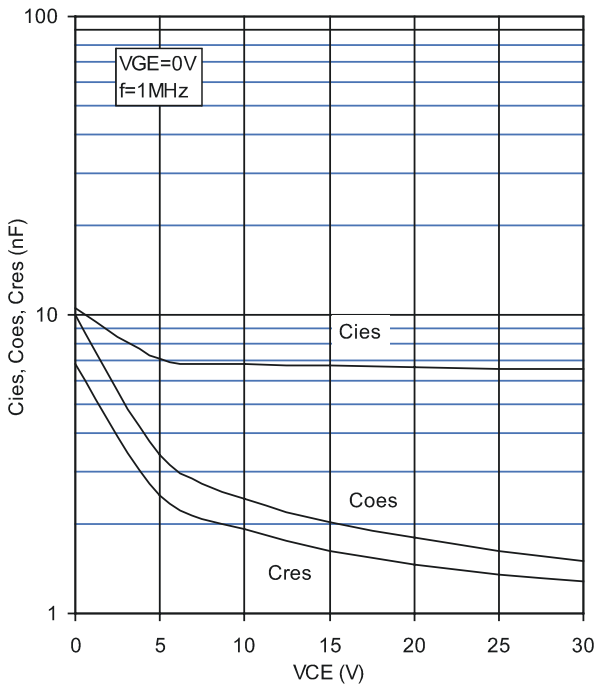


Fig. 9 Typ. Capacitances vs collector-emitter Voltage

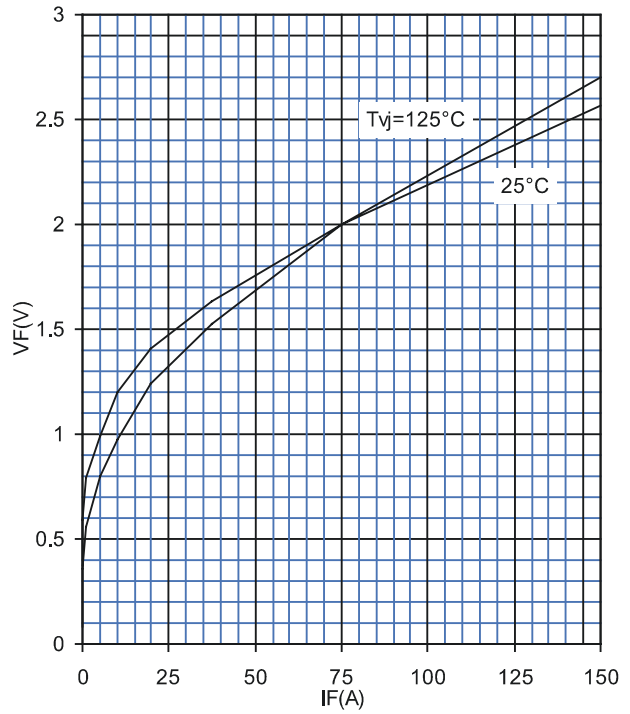


Fig. 10 Typ. Diode forward Characteristics

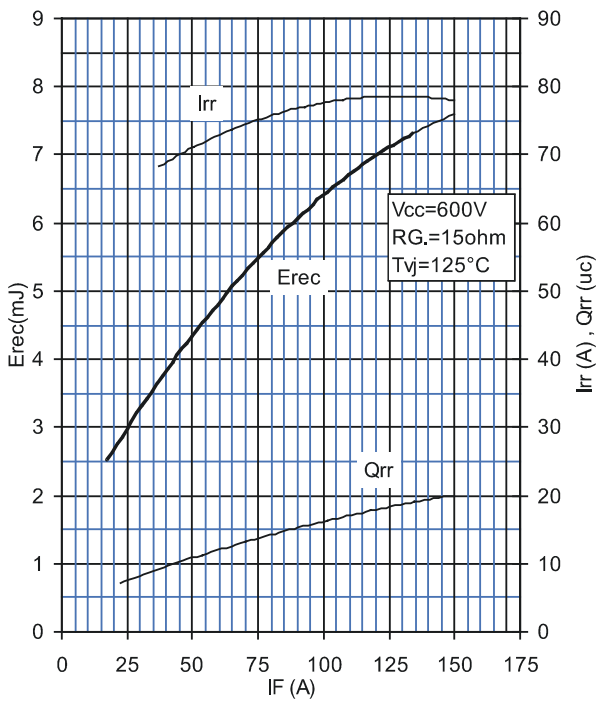


Fig. 11 Typ. Reverse Recovery Characteristics vs forward current

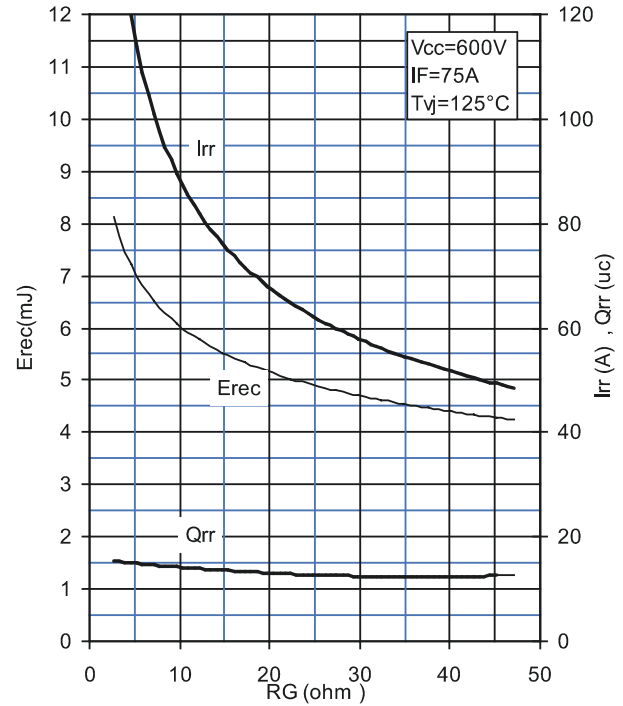


Fig. 12 Typ. Reverse Recovery Characteristics vs gate resistor

# SG75S12S

## Discrete IGBTs

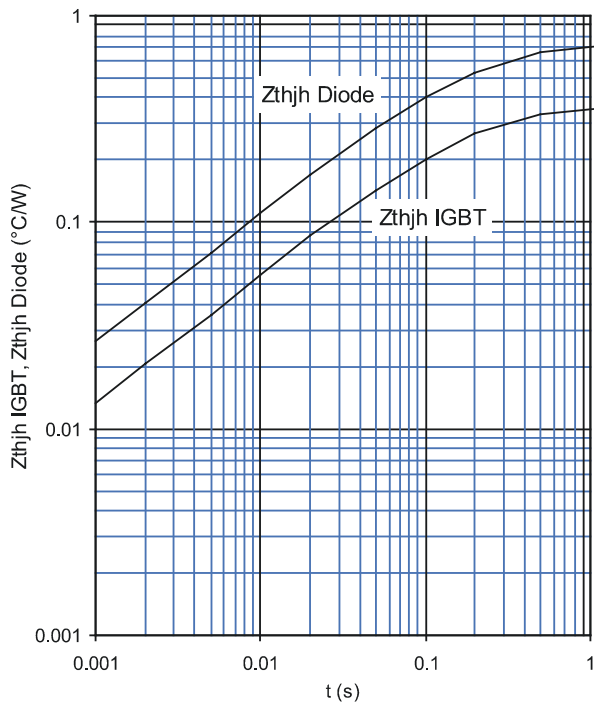


Fig. 13 Typ. Thermal impedance vs time