

600V / 10A 6 in one-package

Features

- Compact Single in -line package

Applications

- Inverter for Motor drive
- AC and DC Servo drive amplifier
- Uninterruptible power supply
- Industrial machines, such as Welding machines

Maximum ratings and characteristics

Absolute maximum ratings (at $T_c=25^\circ\text{C}$ unless otherwise specified)

Item	Symbol	Rating	Unit
Collector-Emitter voltage	V_{CES}	600	V
Gate-Emitter voltage	V_{GES}	± 20	V
Collector current	Continuous	I_c	10 A
	1ms	I_c pulse	20 A
		$-I_c$	10 A
	1ms	$-I_c$ pulse	20 A
Max. power dissipation	P_c	45	W
Operating temperature	T_j	+150	$^\circ\text{C}$
Storage temperature	T_{stg}	-40 to +125	$^\circ\text{C}$
Isolation voltage	V_{is}	AC 2000 (1min.)	V
Screw torque	Mounting *1	1.7	N·m

*1: Recommendable value : 1.3 to 1.7 N·m (M4)

Electrical characteristics (at $T_j=25^\circ\text{C}$ unless otherwise specified)

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	I_{CES}	—	—	1.0	$V_{GE}=0\text{V}$, $V_{CE}=600\text{V}$	mA
Gate-Emitter leakage current	I_{GES}	—	—	0.1	$V_{CE}=0\text{V}$, $V_{GE}=\pm 20\text{V}$	μA
Gate-Emitter threshold voltage	$V_{GE(th)}$	5.5	—	8.5	$V_{CE}=20\text{V}$, $I_c=10\text{mA}$	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	—	—	2.8	$V_{GE}=15\text{V}$, $I_c=10\text{A}$	V
Input capacitance	C_{ies}	—	650	—	$V_{GE}=0\text{V}$	pF
Output capacitance	C_{oes}	—	150	—	$V_{CE}=10\text{V}$	
Reverse transfer capacitance	C_{res}	—	36	—	$f=1\text{MHz}$	
Turn-on time	t_{on}	—	—	1.2	$V_{CC}=300\text{V}$	μs
	t_r	—	—	1.0	$I_c=10\text{A}$	
Turn-off time	t_{off}	—	—	1.0	$V_{GE}=\pm 15\text{V}$	
	t_f	—	—	0.35	$R_G=220\Omega$	
Diode forward on voltage	V_F	—	—	3.0	$I_F=10\text{A}$, $V_{GE}=0\text{V}$	V
Reverse recovery time	t_{rr}	—	—	0.3	$I_F=10\text{A}$, $-di/dt=30\text{A}/\mu\text{s}$, $V_{GE}=-10\text{V}$	μs

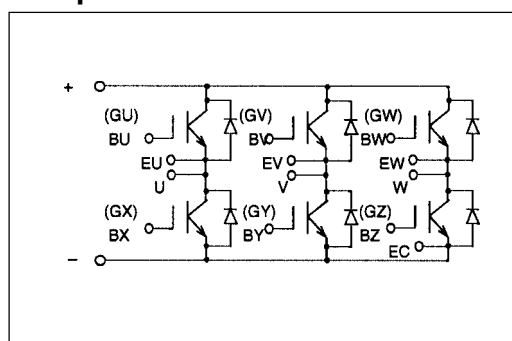
Thermal resistance characteristics

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	$R_{th(j-c)}$	—	—	2.78	IGBT	$^\circ\text{C}/\text{W}$
	$R_{th(j-c)}$	—	—	4.5	Diode	$^\circ\text{C}/\text{W}$
	$R_{th(c-f)}^*2$	—	0.06	—	the base to cooling fin	$^\circ\text{C}/\text{W}$

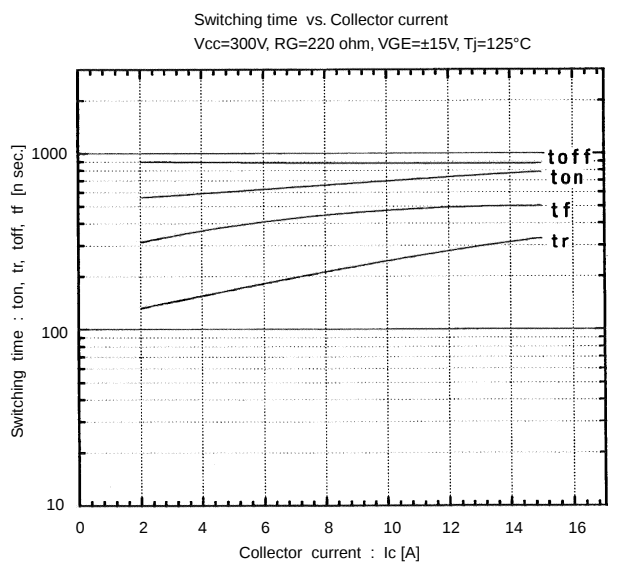
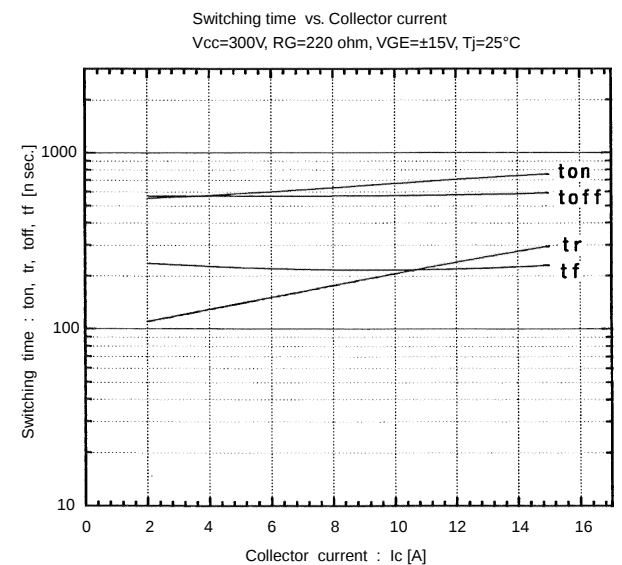
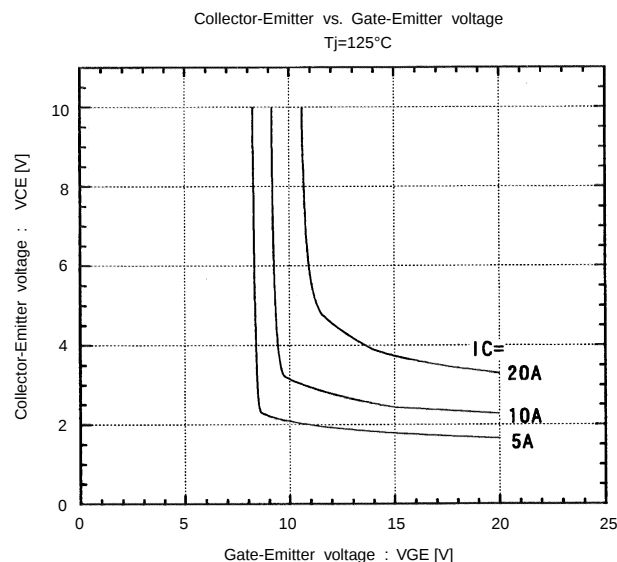
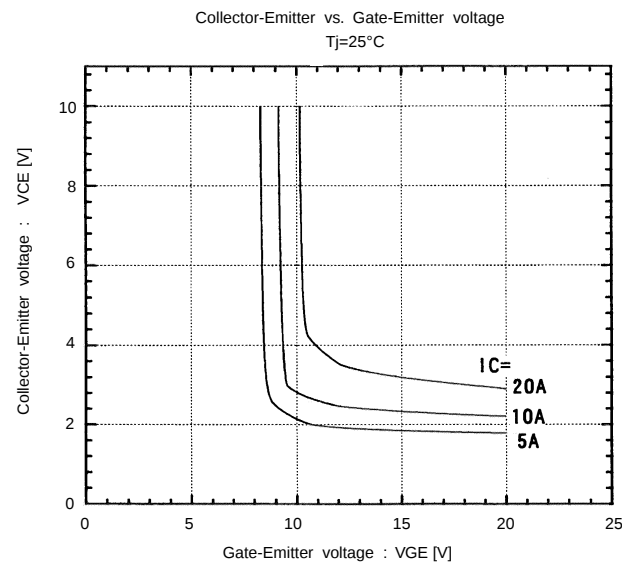
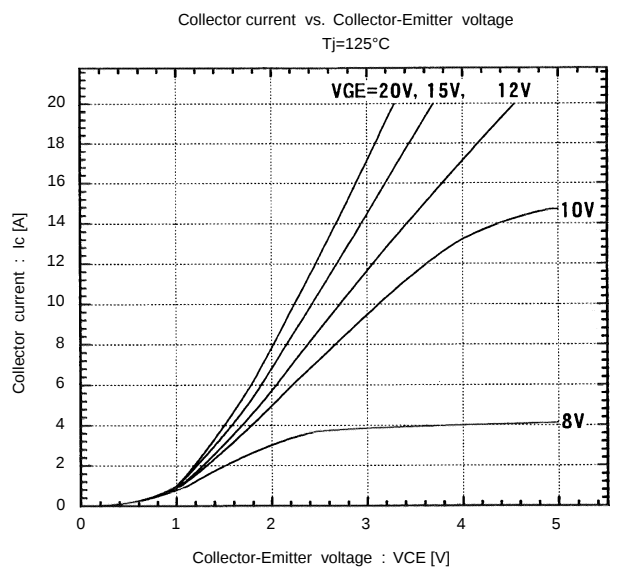
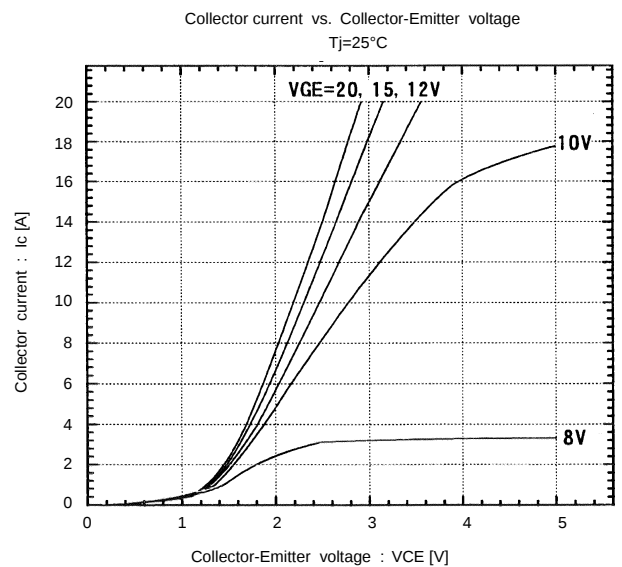
*2: This is the value which is defined mounting on the additional cooling fin with thermal compound

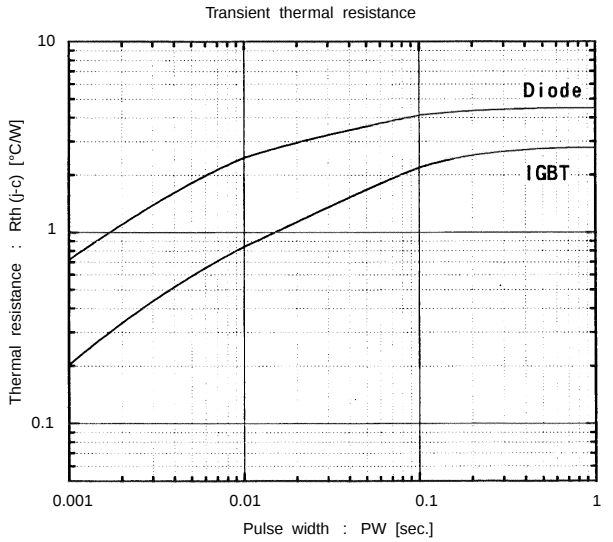
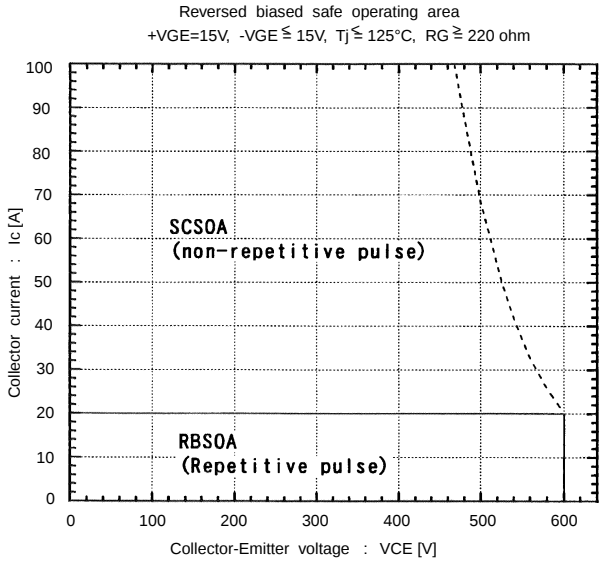
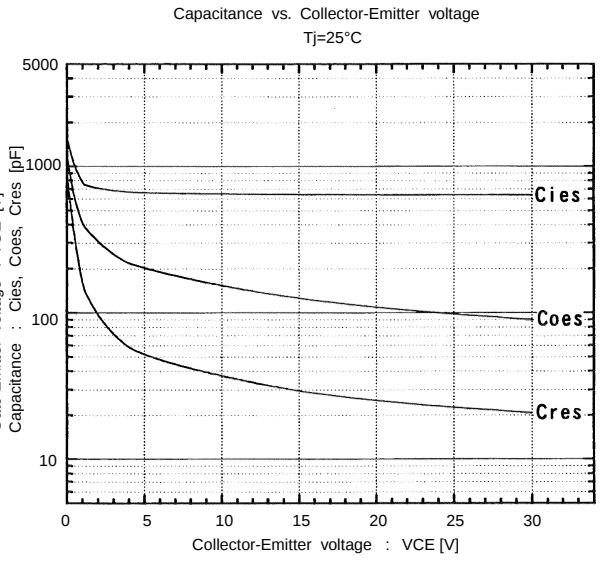
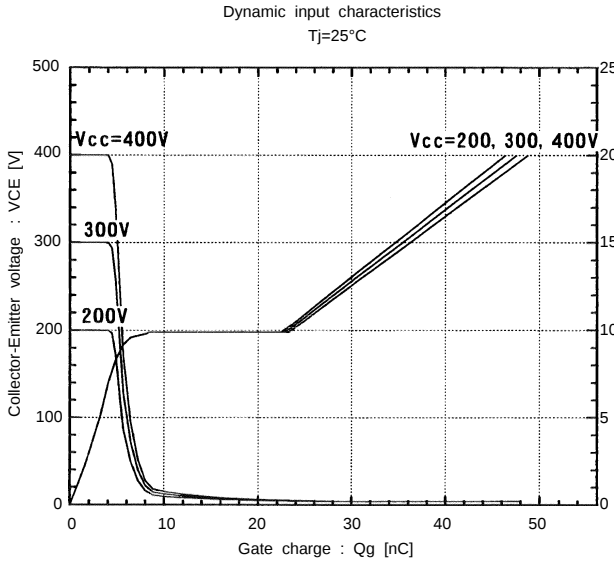
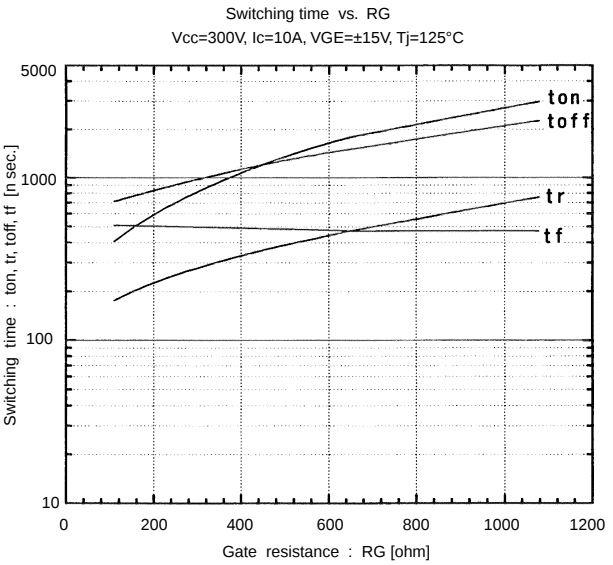
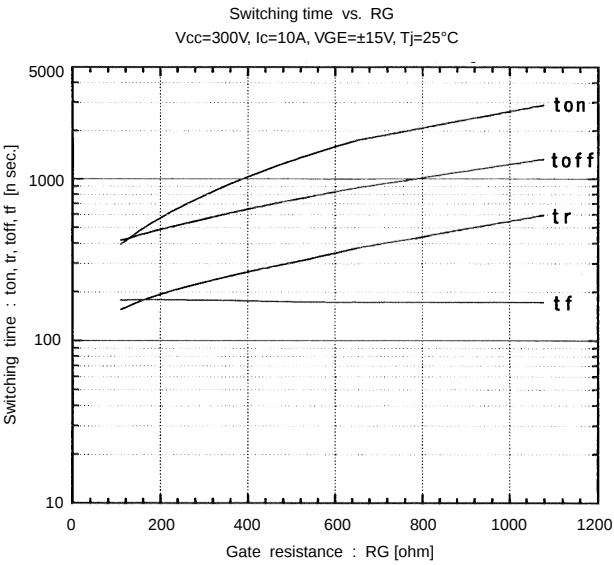


Equivalent Circuit Schematic

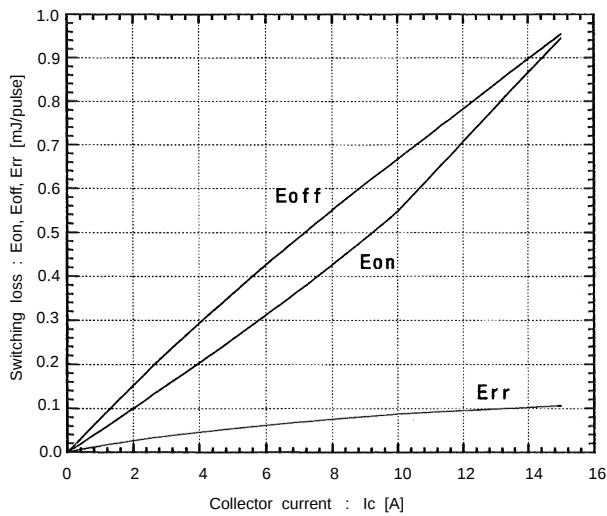


■ Characteristics (Representative)

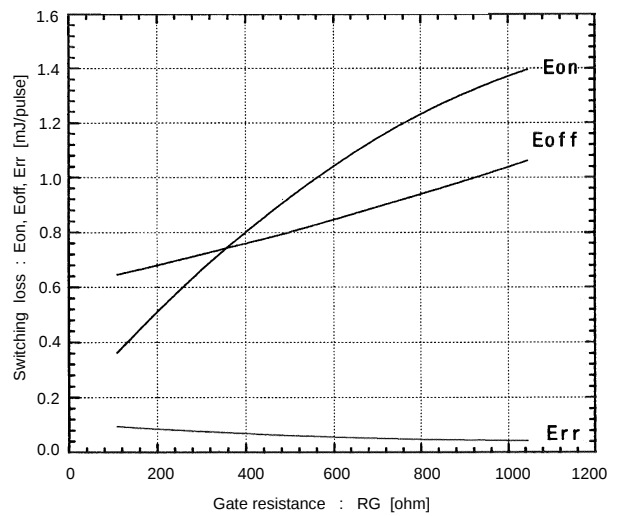




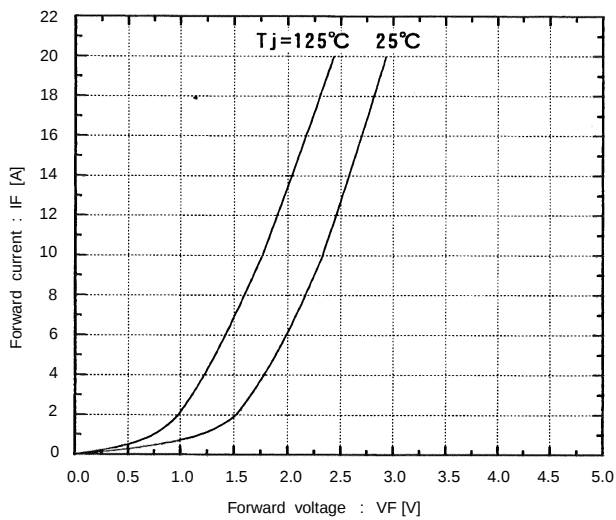
Switching loss vs. Collector current
 $V_{cc}=300V$, $R_G=220\ \Omega$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$



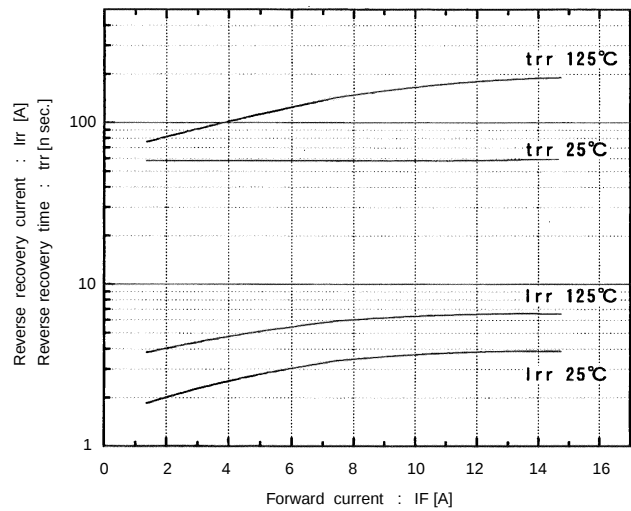
Switching loss vs. Gate resistance
 $V_{cc}=300V$, $I_c=10A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$



Forward current vs. Forward voltage



Reverse recovery characteristics
 t_{rr} , I_{rr} , vs. I_F



Outline Drawings, mm

