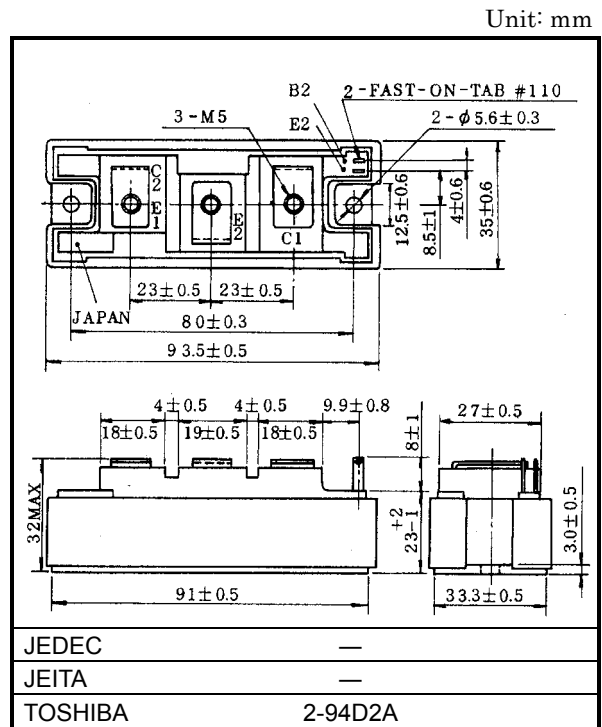
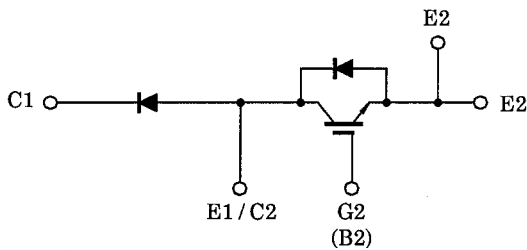


# MG50J1ZS40

High Power Switching Applications  
 Motor Control Applications

- High input impedance
- High speed :  $t_f = 0.35\mu s$  (max)  
 $t_{rr} = 0.15\mu s$  (max)
- Low saturation voltage  
 :  $V_{CE(sat)} = 3.5V$  (max)
- Enhancement-mode
- The electrodes are isolated from case.

## Equivalent Circuit

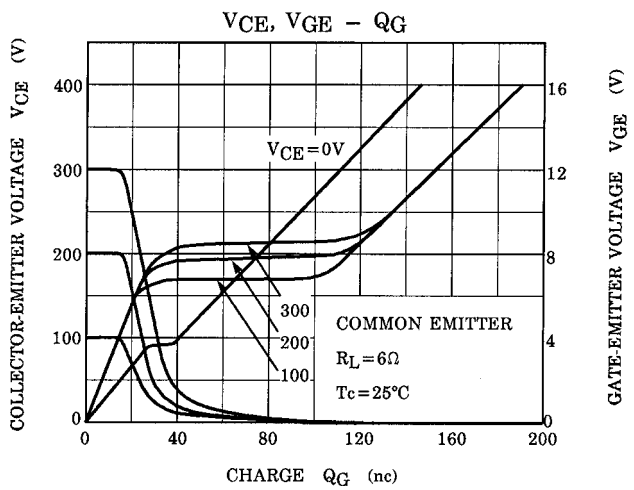
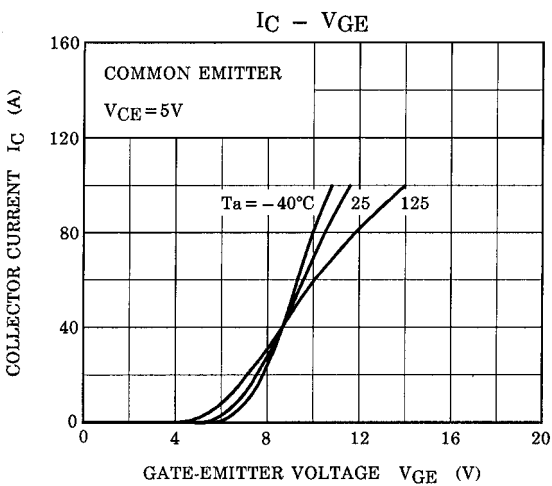
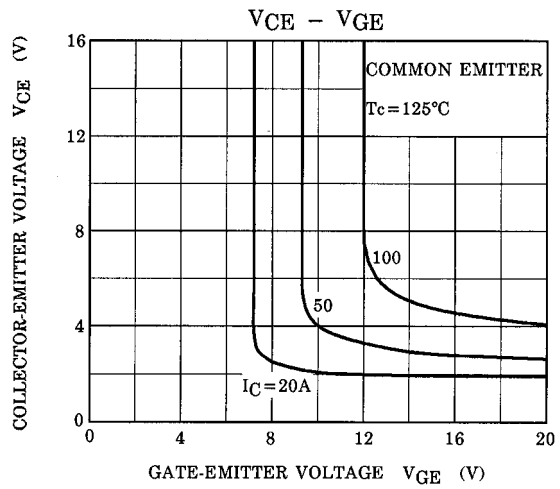
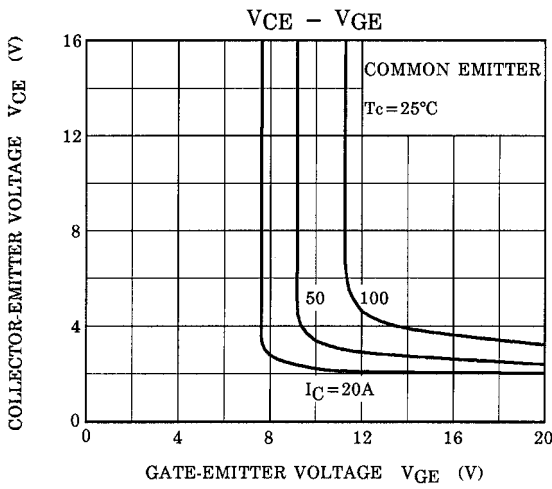
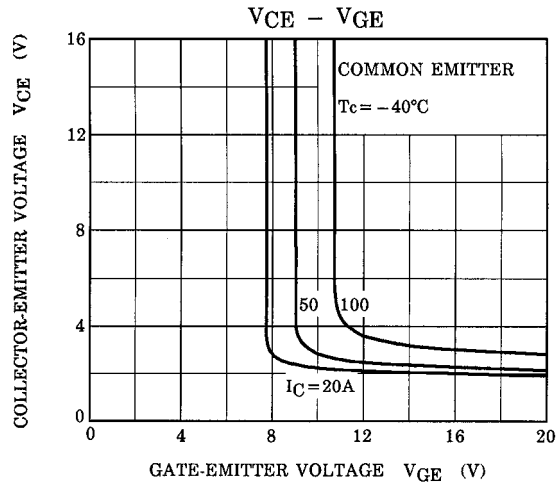
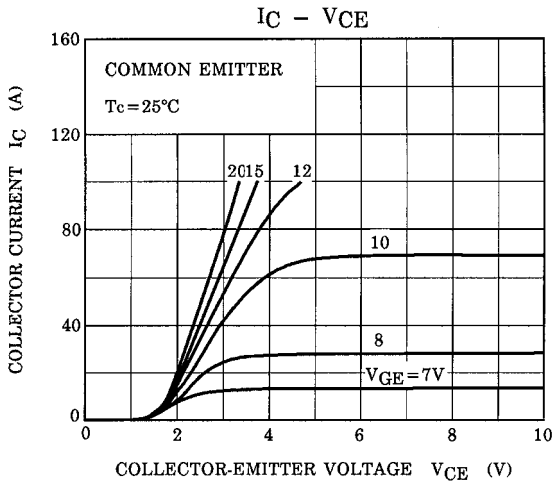


## Maximum Ratings (Ta = 25°C)

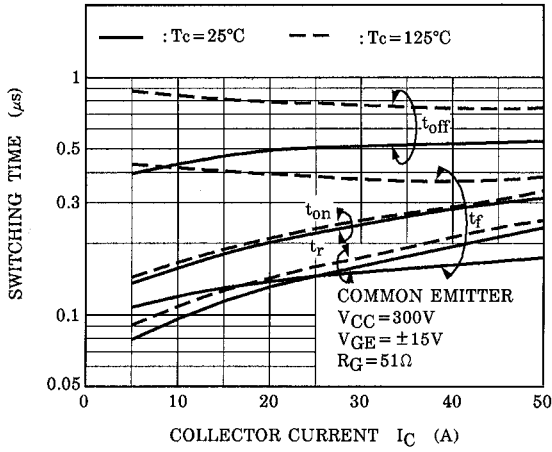
Characteristics		Symbol	Rating	Unit
Collector-emitter voltage		$V_{CES}$	600	V
Gate-emitter voltage		$V_{GES}$	±20	V
Reverse voltage		$V_R$	600	V
Collector current	DC	$I_C$	50	A
	1ms	$I_{CP}$	100	
Forward current	DC	$I_F$	50	A
	1ms	$I_{FM}$	100	
Collector power dissipation (Tc = 25°C)		$P_C$	250	W
Junction temperature		$T_j$	150	°C
Storage temperature range		$T_{stg}$	-40 ~ 125	°C
Isolation voltage		$V_{isol}$	2500 (AC, 1 minute)	V
Screw torque (Terminal / mounting)		—	3 / 3	N·m

## Electrical Characteristics (Ta = 25°C)

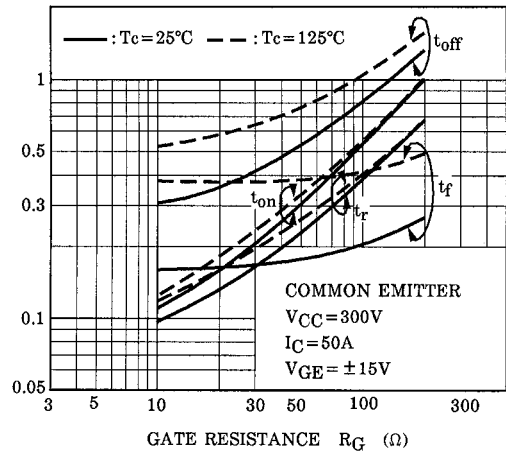
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GES}$	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	$\pm 500$	nA
Collector cut-off current		$I_{CES}$	$V_{CE} = 600V, V_{GE} = 0$	—	—	1.0	mA
Collector-emitter breakdown voltage		$V_{(BR)CES}$	$I_C = 10mA, V_{GE} = 0$	600	—	—	V
Gate-emitter cut-off voltage		$V_{GE (off)}$	$I_C = 50mA, V_{CE} = 5V$	3.0	—	6.0	V
Collector-emitter saturation voltage		$V_{CE (sat)}$	$I_C = 50A, V_{GE} = 15V$	—	2.7	3.5	V
Input capacitance		$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0f = 1MHz$	—	4000	—	pF
Switching time	Rise time	$t_r$		—	0.30	0.60	μs
	Turn-on time	$t_{on}$		—	0.40	0.80	
	Fall time	$t_f$		—	0.18	0.35	
	Turn-off time	$t_{off}$		—	0.60	1.00	
Reverse current		$I_R$	$V_R = 600V$	—	—	1.0	mA
Forward voltage		$V_F$	$I_F = 50A, V_{GE} = 0$	—	1.7	2.5	V
Reverse recovery time		$t_{rr}$	$I_F = 50 A, V_{GE} = -10 V, di / dt = 100 A / \mu s$	—	0.08	0.15	μs
Thermal resistance		$R_{th (j-c)}$	Transistor	—	—	0.50	°C / W
			Diode	—	—	1.00	



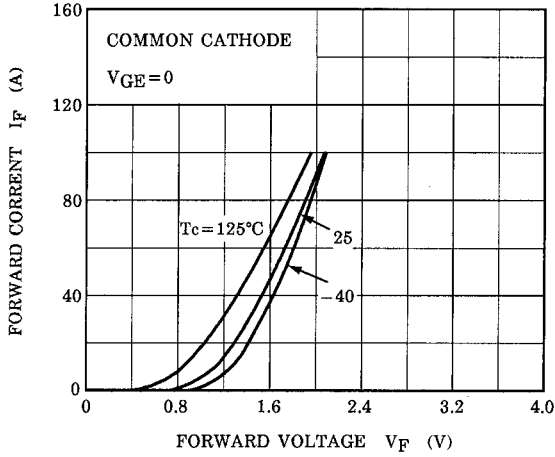
SWITCHING TIME -  $I_C$



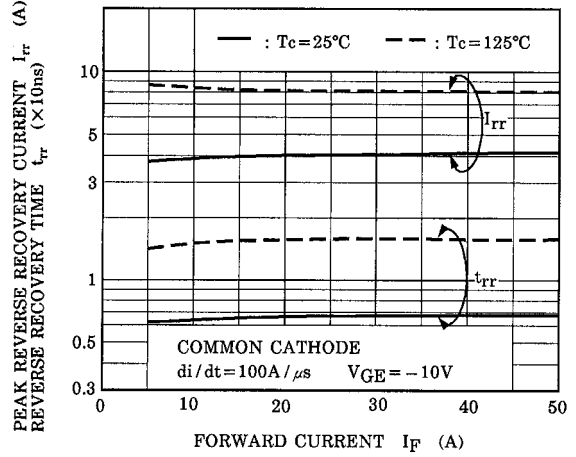
SWITCHING TIME -  $R_G$



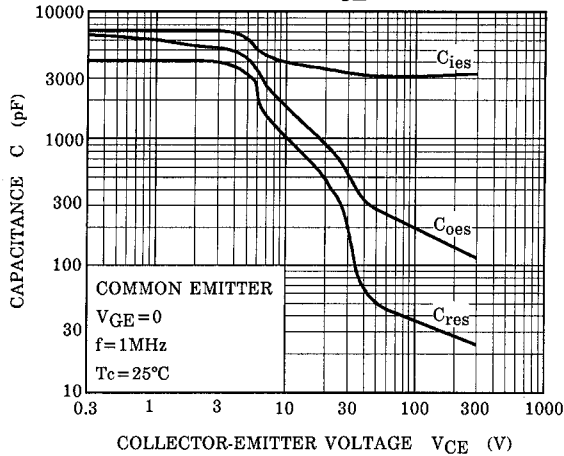
$I_F - V_F$



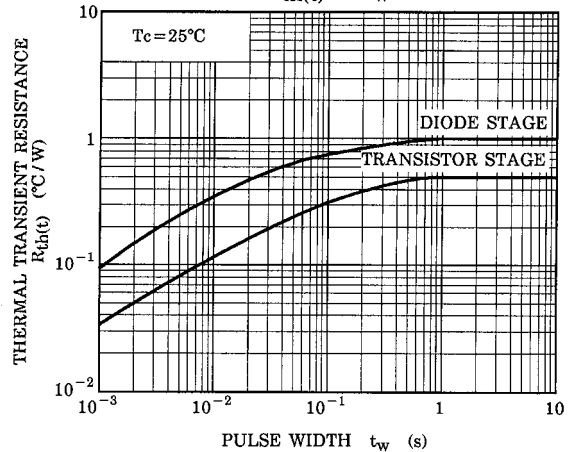
$t_{rr}, I_{rr} - I_F$

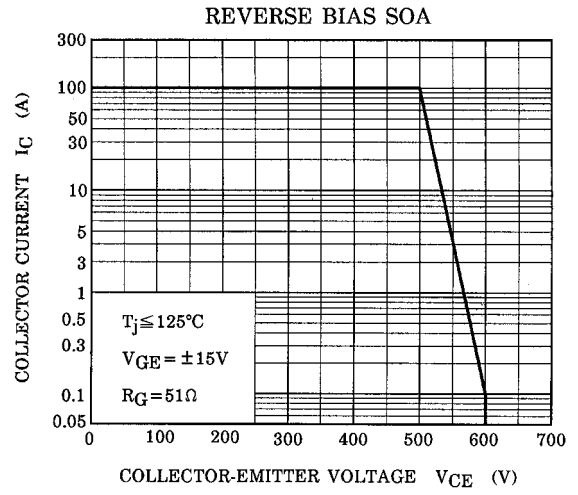
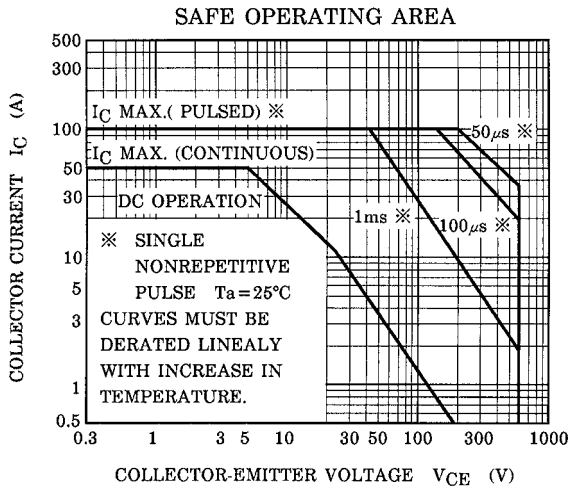


C -  $V_{CE}$



$R_{th}(t) - t_w$





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