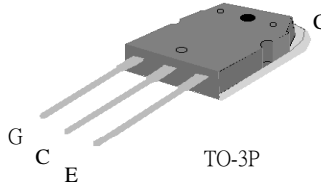


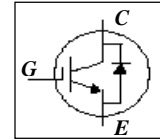


**Features**

- ▼ High Speed Switching
- ▼ Low Saturation Voltage  
 $V_{CE(sat), Typ.} = 1.8V @ I_C = 20A$
- ▼ Built-in Fast Recovery Diode



$V_{CES}$	600V
$I_C$	20A



**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
$V_{CES}$	Collector-Emitter Voltage	600	V
$V_{GE}$	Gate-Emitter Voltage	$\pm 20$	V
$I_C @ T_C = 25^\circ C$	Collector Current	40	A
$I_C @ T_C = 100^\circ C$	Collector Current	20	A
$I_{CM}$	Pulsed Collector Current <sup>1</sup>	160	A
$I_{DM}$	Collector to Emitter Diode Forward Current <sup>1</sup>	40	A
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	125	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	150	$^\circ C$
$T_L$	Maximum Lead Temp. for Soldering Purposes , 1/8" from case for 5 seconds .	300	$^\circ C$

**Notes:**

1. Pulse width limited by max. junction temperature .

**Thermal Data**

Symbol	Parameter	Value	Units
Rthj-c	Thermal Resistance Junction-Case	1	$^\circ C/W$
Rthj-c(Diode)	Thermal Resistance Junction-Case	1.5	$^\circ C/W$
Rthj-a	Thermal Resistance Junction-Ambient	40	$^\circ C/W$

**Electrical Characteristics @  $T_J = 25^\circ C$  (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_{GES}$	Gate-to-Emitter Leakage Current	$V_{GE} = \pm 20V, V_{CE} = 0V$	-	-	$\pm 100$	nA
$I_{CES}$	Collector-Emitter Leakage Current	$V_{CE} = 600V, V_{GE} = 0V$	-	-	100	$\mu A$
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE} = 15V, I_C = 20A$	-	1.8	2.3	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{CE} = V_{GE}, I_C = 250\mu A$	2	-	6	V
$Q_g$	Total Gate Charge	$I_C = 20A$	-	100	160	nC
$Q_{ge}$	Gate-Emitter Charge	$V_{CE} = 480V$	-	24	-	nC
$Q_{gc}$	Gate-Collector Charge	$V_{GE} = 15V$	-	40	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CE} = 480V,$ $I_C = 20A,$ $V_{GE} = 15V,$ $R_G = 5\Omega,$ Inductive Load	-	50	-	ns
$t_r$	Rise Time		-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	135	-	ns
$t_f$	Fall Time		-	190	380	ns
$E_{on}$	Turn-On Switching Loss		-	0.3	-	mJ
$E_{off}$	Turn-Off Switching Loss		-	0.9	-	mJ
$C_{ies}$	Input Capacitance	$V_{GE} = 0V$	-	3400	5440	pF
$C_{oes}$	Output Capacitance	$V_{CE} = 30V$	-	75	-	pF
$C_{res}$	Reverse Transfer Capacitance	$f = 1.0MHz$	-	50	-	pF

$V_F$	FRD Forward Voltage	$I_F = 20A$	-	1.65	2	V
$t_{rr}$	FRD Reverse Recovery Time	$I_F = 10A$	-	50	-	ns
$Q_{rr}$	FRD Reverse Recovery Charge	$di/dt = 100 A/\mu s$	-	80	-	nC

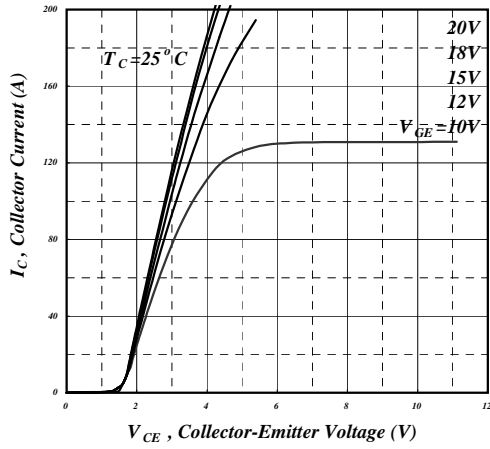


Fig 1. Typical Output Characteristics

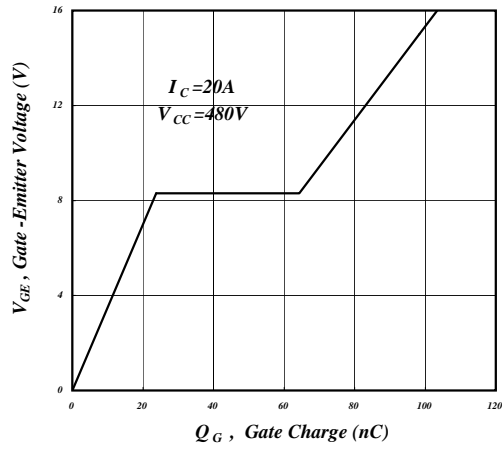


Fig 2. Gate Charge Characteristics

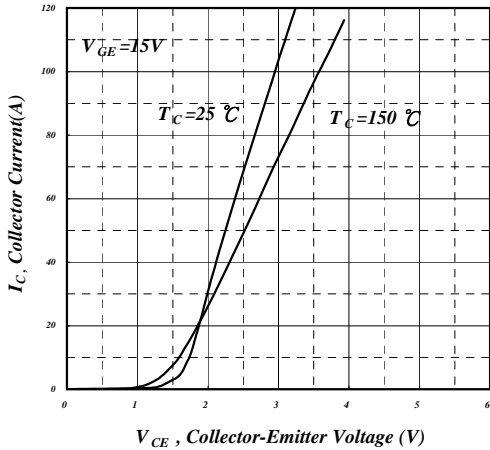


Fig 3. Typical Saturation Voltage Characteristics

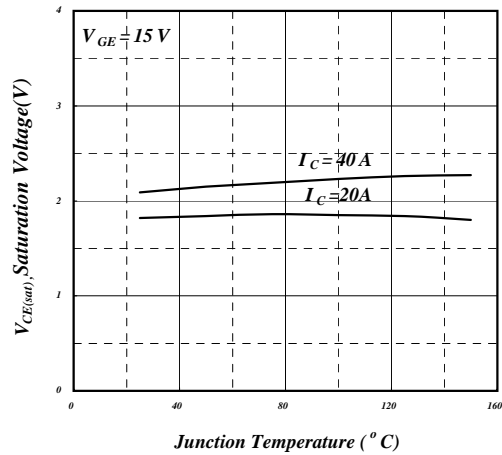


Fig 4. Typical Collector-Emmitter Voltage v.s. Junction Temperature

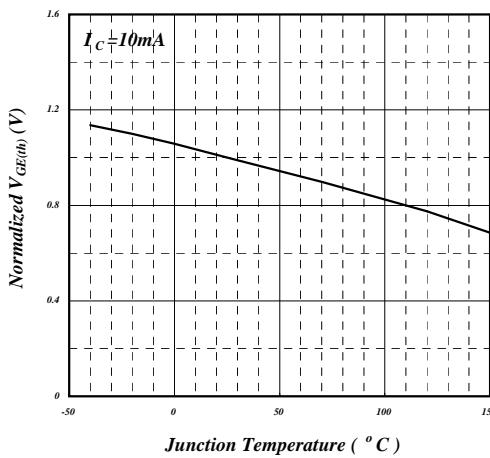


Fig 5. Gate Threshold Voltage v.s. Junction Temperature

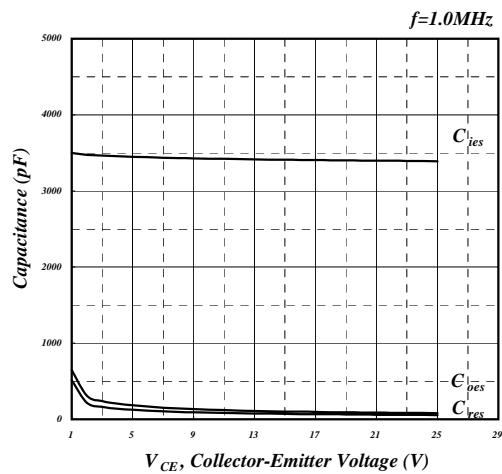


Fig 6. Typical Capacitance Characteristics

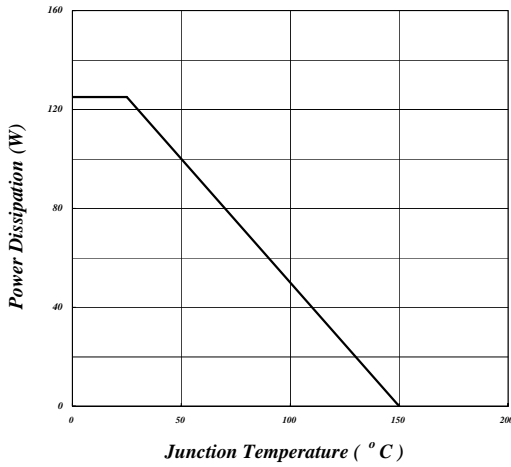


Fig7. Power Dissipation vs. Junction Temperature

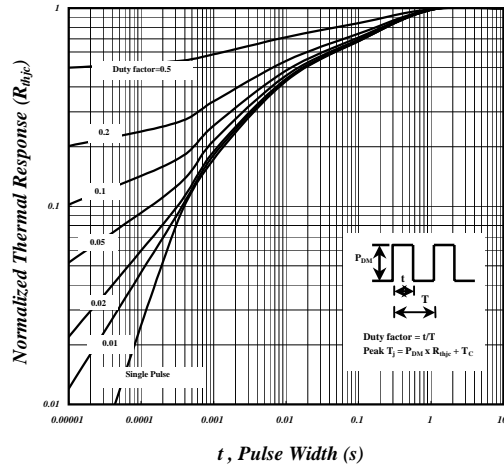


Fig 8. Effective Transient Thermal Impedance

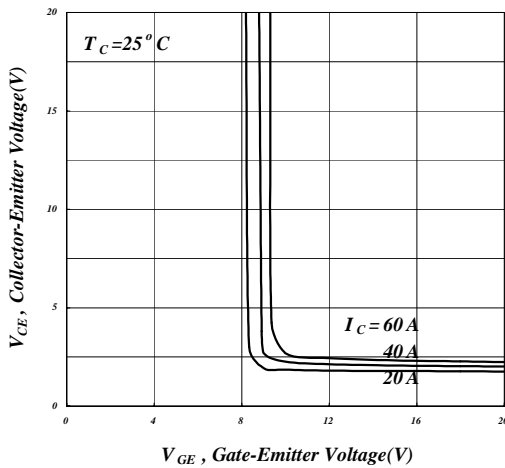


Fig 9. Saturation Voltage vs. V<sub>GE</sub>

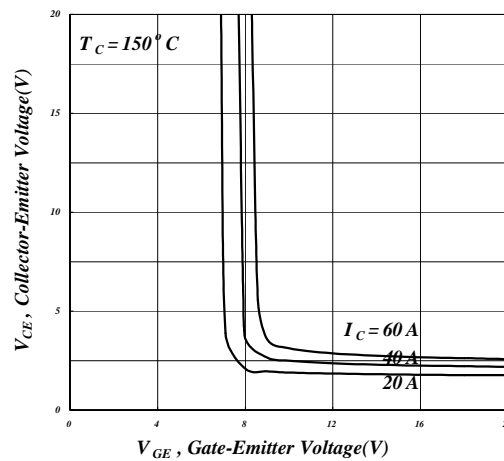


Fig 10. Saturation Voltage vs. V<sub>GE</sub>

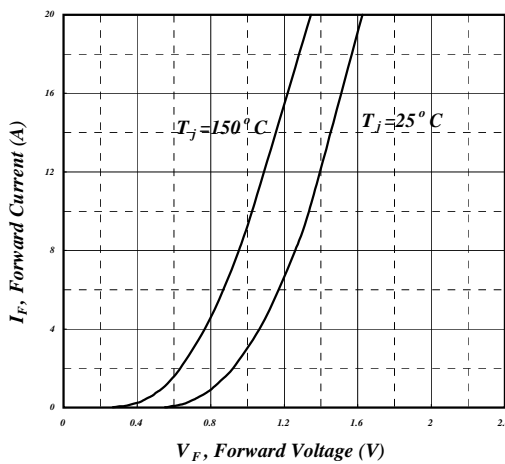


Fig 11. Forward Characteristic of Diode

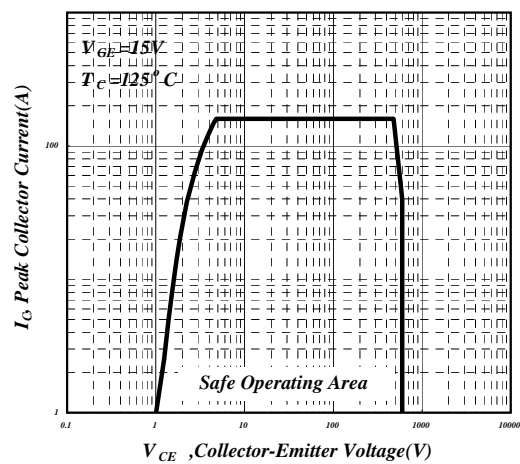


Fig 12. Turn-off SOA