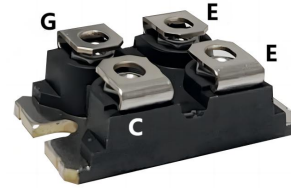


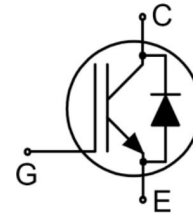
Features

- $V_{CE}=1200V, I_C=140A$
- Very Low Saturation Voltage:
 $V_{CE(sat)} = 1.94V @ I_C = 100 A \text{ at } T_{vj}=25^{\circ}C$
- Maximum Junction Temperature: $T_J = 175^{\circ}C$
- Positive Temperature Co-Efficient
- Tight Parameter Distribution
- High Input Impedance



Applications

- EV-Charge
- String Converter
- Industrial UPS
- Other Power-Train Applications
Requiring High Power Switch



Absolute Ratings($T_c=25^{\circ}C$)

Parameter	Symbol		Value	Unit
Collector-Emitter Voltage	V_{ces}		1200	V
Collector Current-continuous	I_C	$T_C=25^{\circ}C$	280	A
		$T_C=100^{\circ}C$	140	A
Diode forward current	I_F	$T_C=25^{\circ}C$	280	A
		$T_C=100^{\circ}C$	140	A
Collector Current-pulse (note 1)	I_{CM}		420	A
Gate-Emitter Voltage	V_{GES}		± 20	V
Power Dissipation	P_D	$T_c=25^{\circ}C$	746	W
		$T_c=100^{\circ}C$	373	W
Operating Temperature Range	T_J		-40~+175	$^{\circ}C$
Storage Temperature Range	T_{STG}		-55~+150	
Short Circuit Withstand Time (note 2)	t_{sc}		5	us
Maximum Lead Temperature for Soldering Purposes	T_{sold}		260	$^{\circ}C$
Isolation Voltage for Case to Terminal	V_{ISO}		3.0	KV

Electrical Characteristics

Parameter	Symbol	Tests conditions	Min	Type	Max	Units
Off-Characteristics						
Collector-Emitter Voltage	BV_{CES}	$I_C=250\mu A, V_{GE}=0V$	1200	-	-	V
Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V, T_C=25^\circ C$	-	-	40	μA
Gate-body leakage current, forward	I_{GESF}	$V_{CE}=0V, V_{GE}=20V$	-	-	250	nA
Gate-body leakage current, reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-20V$	-	-	-250	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=500\mu A$	4.5	5.5	6.5	V
Collector-Emitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=100A$	-	1.94	2.55	V
Dynamic Characteristics						
Input capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1.0MHz$	-	18	-	nF
Output capacitance	C_{oes}		-	306	-	pF
Reverse transfer capacitance	C_{res}		-	91	-	pF
Transconductance	g_{fs}	$I_C = 140 A, V_{CE} = 20 V, T_{vj} = 175^\circ C$ (Note 4)	-	151	-	S
Short-circuit collector current	I_{SC}	$V_{CC} \leq 600 V, V_{GE} = 15 V, t_{SC} \leq 5\mu s$, (Note 4)	-	700	-	A

Electrical Characteristics

Parameter	Symbol	Tests conditions	Min	Type	Max	Units
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC}=600V, I_C=140A, R_G=5\Omega, V_{GE}=15V, \text{ Inductive Load } T_C=25^\circ C$	-	53	-	ns
Turn-On rise time	t_r		-	45	-	ns
Turn-Off delay time	$t_{d(off)}$		-	102	-	ns
Turn-Off Fall time	t_f		-	30	-	ns
Turn-on Loss	E_{on}		-	6.8	-	mJ
Turn-off Loss	E_{off}		-	3.5	-	mJ
Total Loss	E_{ts}		-	10.3	-	mJ
Turn-on delay time	$t_{d(on)}$	$V_{CC}=600V, I_C=140A, R_G=5\Omega, V_{GE}=15V,$	-	50.5	-	ns
Turn-On rise time	t_r		-	32.5	-	ns

Turn-Off delay time	$t_{d(off)}$	Inductive Load Tc=150°C	-	119	-	ns
Turn-Off Fall time	t_f		-	110	-	ns
Turn-on switching Loss	E_{on}		-	9.5	-	mJ
Turn-off switching Loss	E_{off}		-	6.0	-	mJ
Total switching Loss	E_{ts}		-	15.8	-	mJ
Gate Charge	Q_g	V_{CC} =600V,Ic=140A V_{GE} =15V	-	281	-	nC
Gate to Emitter Charge	Q_{ge}		-	66	-	nC
Gate to Collector Charge	Q_{gc}		-	94	-	nC
Anti-Parallel Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Voltage	V_F	I_F =100A	-	1.7	-	V
Diode Reverse recovery time	t_{rr}	I_F =140A di_F/dt =500A/us T_J =25°C	-	123	-	ns
Diode Reverse recovery charge	Q_{rr}		-	1.95	-	μC

Thermal Characteristic

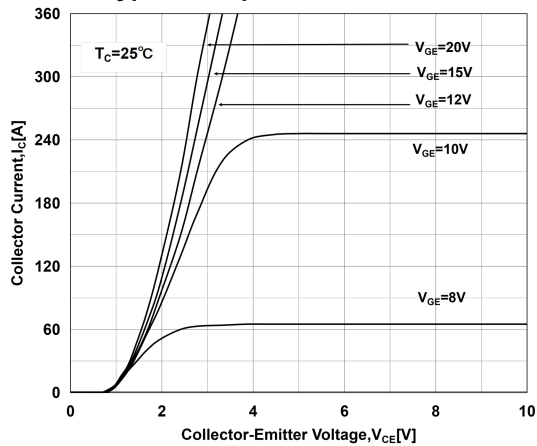
Parameter	Symbol	Max	Unit
Thermal Resistance, Junction to Case (IGBT)	$R_{th(j-c)}$	0.16	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction to Case (Diode)	$R_{th(j-c)}$	0.27	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	40	$^{\circ}\text{C}/\text{W}$

Notes:

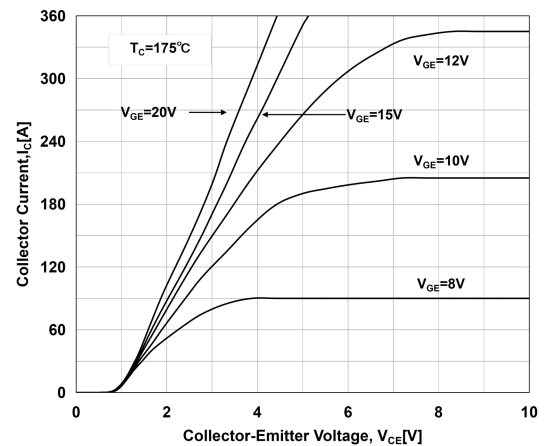
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $V_{CC} \leq 600\text{ V}$, $V_{GE} = 15\text{ V}$, Allowed number of short circuits < 1000, Time between short circuits $\geq 1.0\text{ s}$, $T_{vj} = 150^{\circ}\text{C}$
3. Switching times & energy losses may increase for higher $V_{CE}(\text{clamp})$, T_J or R_G
4. Allowed number of short circuits < 1000, Time between short circuits $\geq 1.0\text{ s}$

Electrical Characteristics(curves)

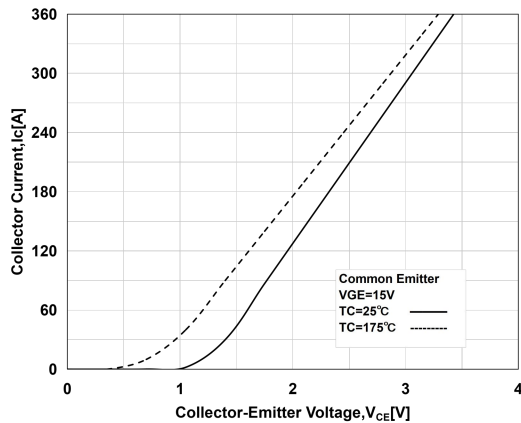
Typical Output Characteristics



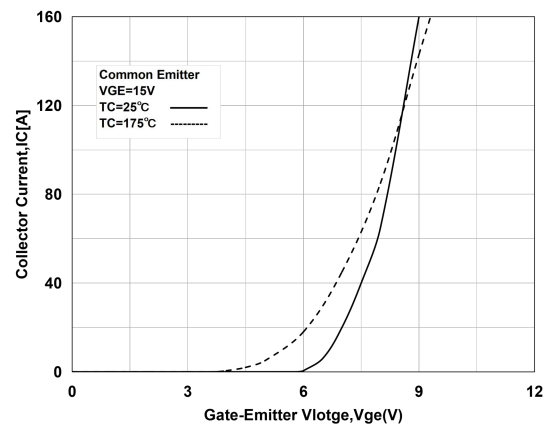
Typical Output Characteristics



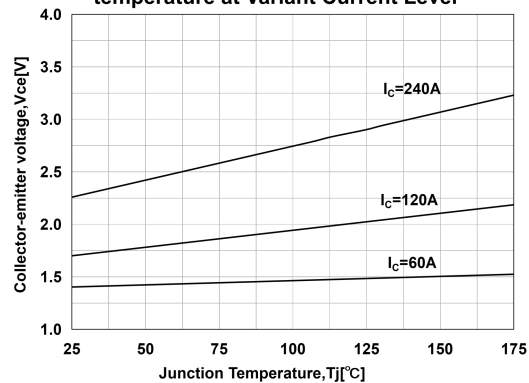
Typical Saturation Voltage Characteristics



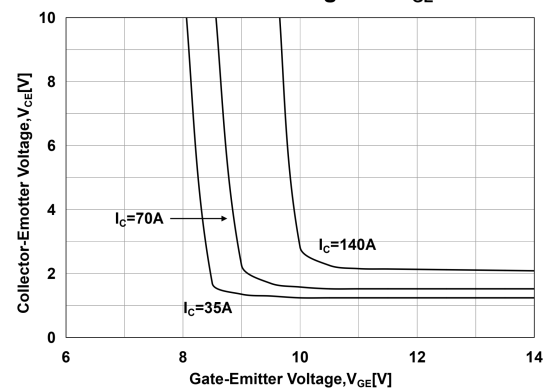
Transfer Characteristics

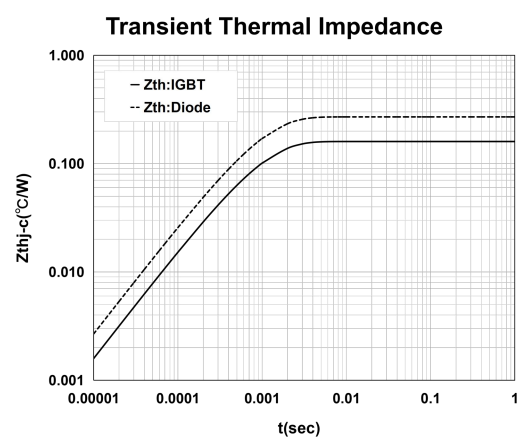
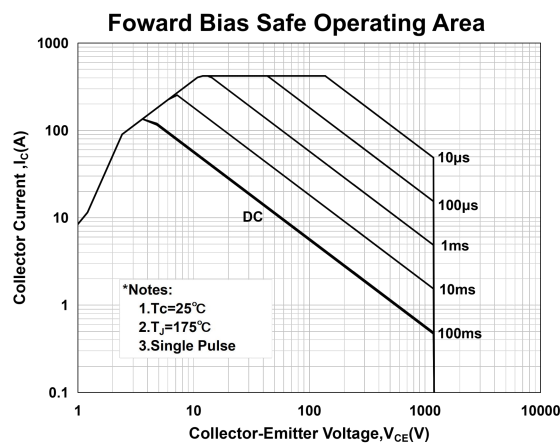
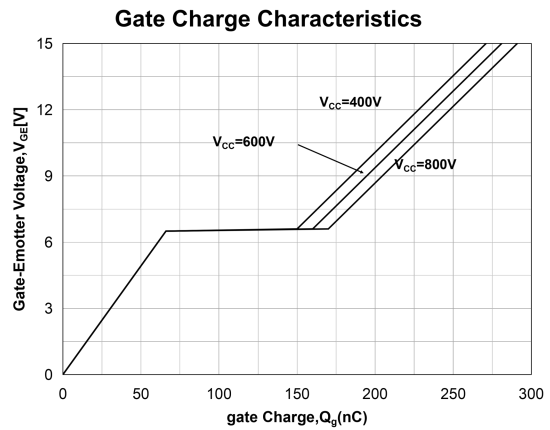
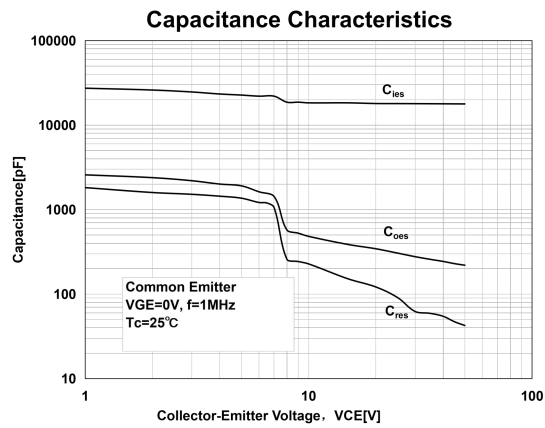
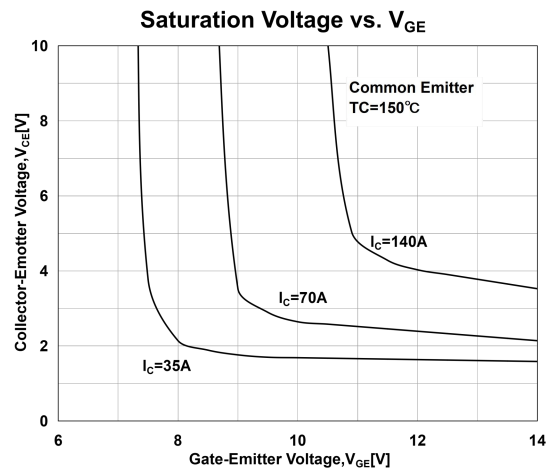
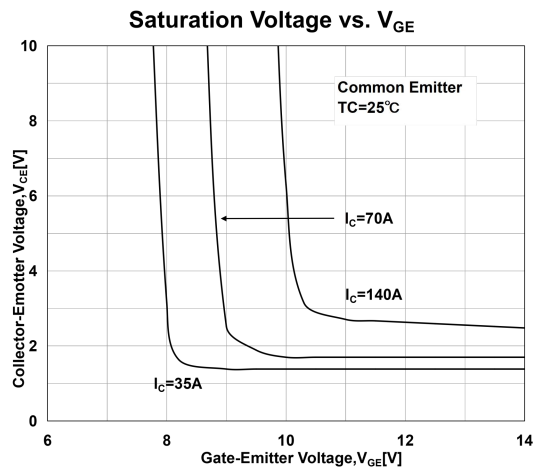


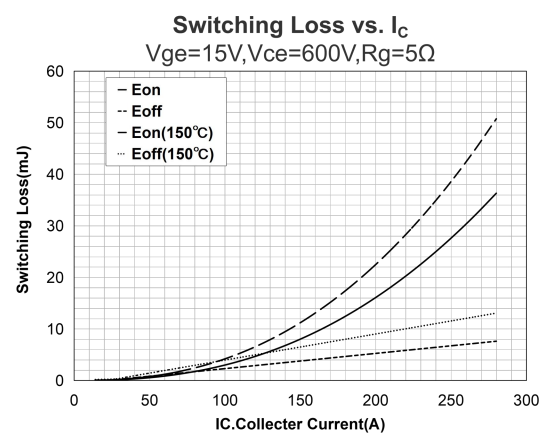
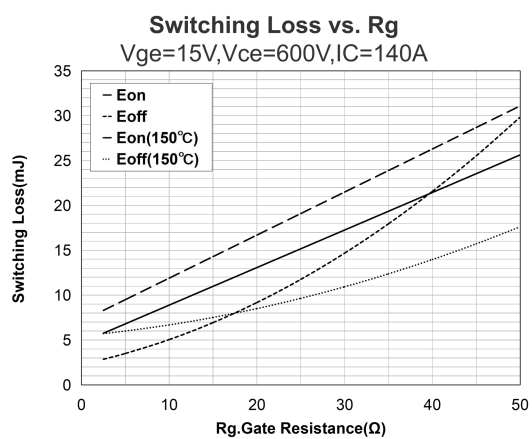
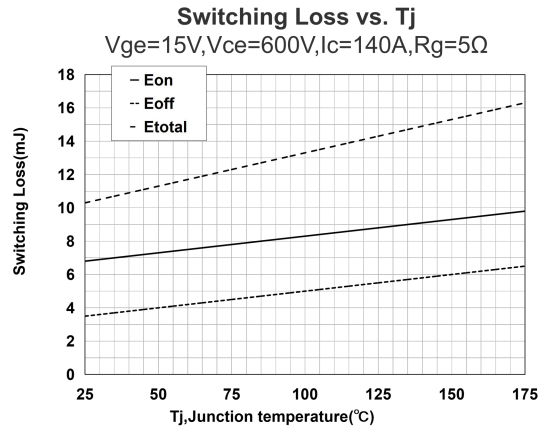
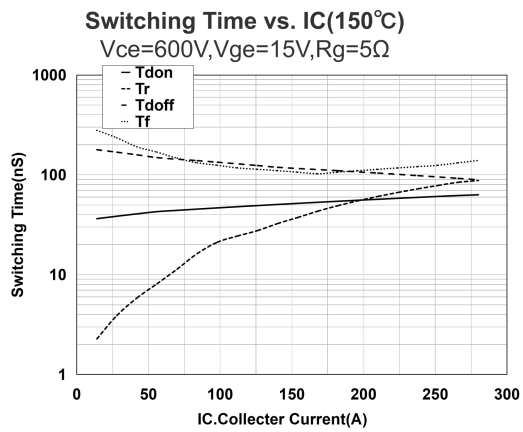
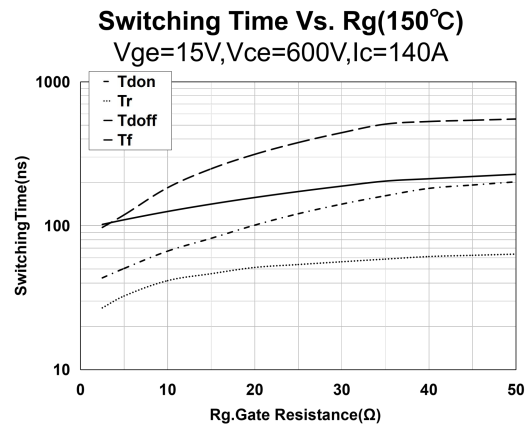
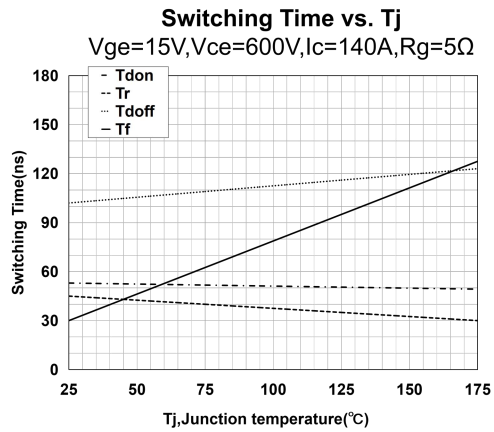
Saturation Voltage vs. Junction temperature at Variant Current Level

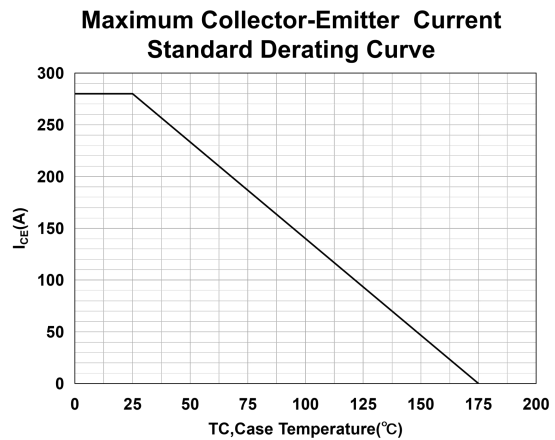
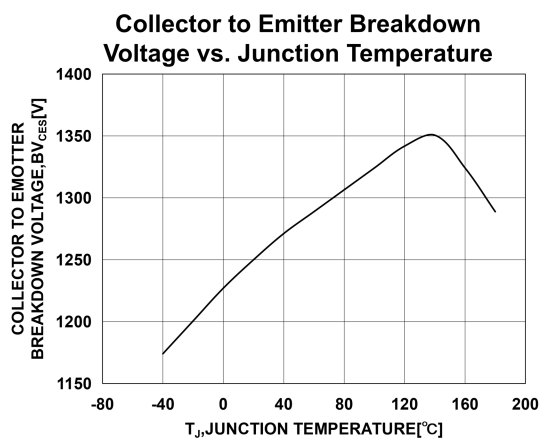
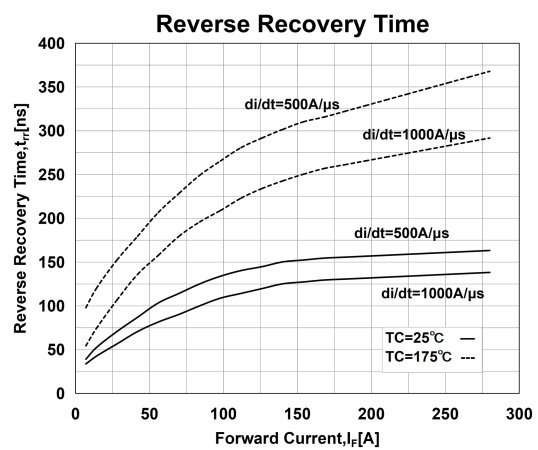
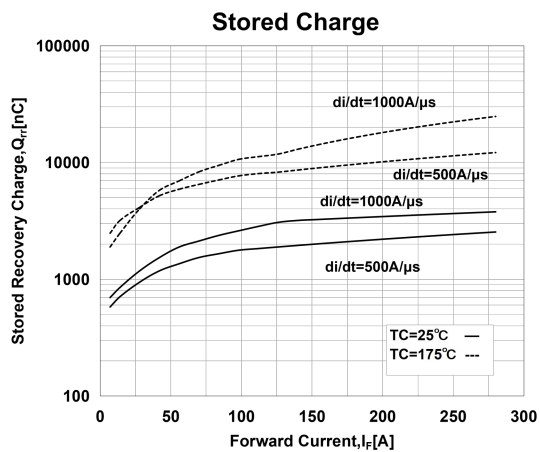
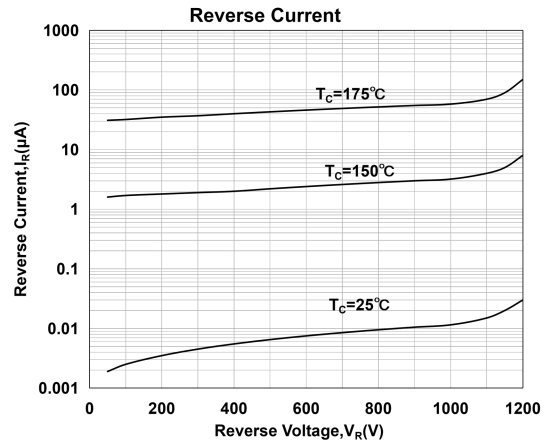
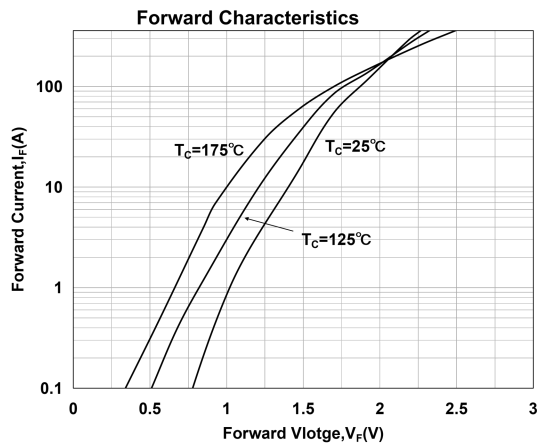


Saturation Voltage vs. V_{ge}

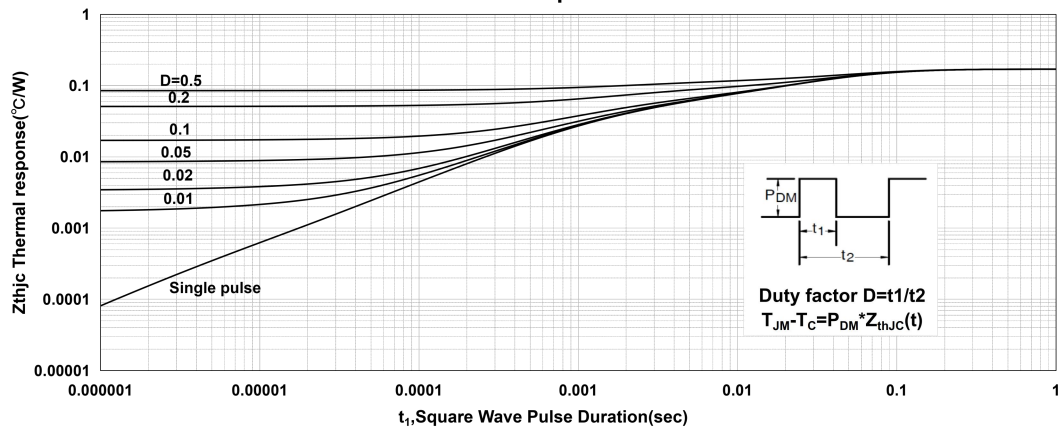




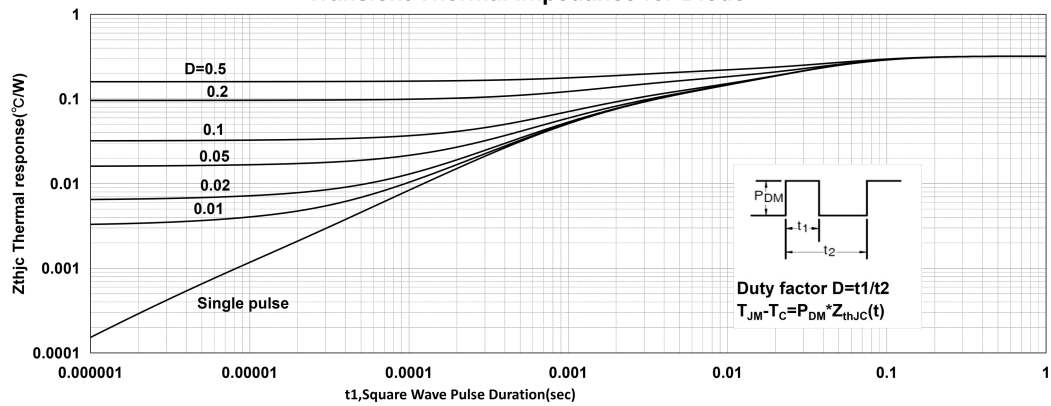




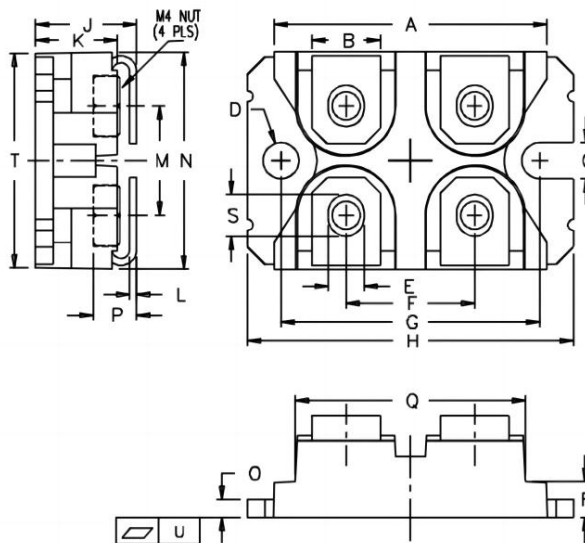
Transient Thermal Impedance for IGBT



Transient Thermal Impedance for Diode



Package Mechanical DATA



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	38.00	38.23	1.496	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