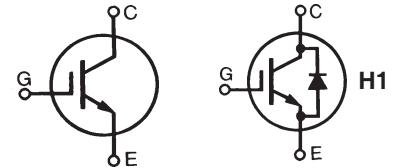




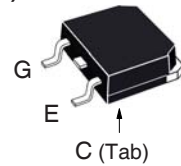
High Voltage IGBT w/ Sonic Diode

IXGT16N170A
IXGH16N170A
IXGT16N170AH1
IXGH16N170AH1

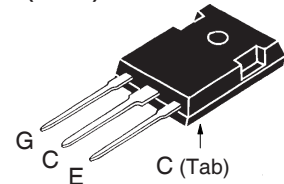
$V_{CES} = 1700V$
 $I_{C90} = 11A$
 $V_{CE(sat)} \leq 5.0V$
 $t_{fi(typ)} = 35ns$



TO-268 (IXGT)



TO-247 (IXGH)



G = Gate C = Collector
 E = Emitter Tab = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C$ to $150^\circ C$	1700	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	1700	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	16	A
I_{C90}	$T_C = 90^\circ C$	11	A
I_{F90}	$T_C = 90^\circ C$	17	A
I_{CM}	$T_C = 25^\circ C$, 1ms	40	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 10\Omega$ Clamped Inductive Load	$I_{CM} = 40$ $0.8 \cdot V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15V$, $V_{CE} = 1200V$, $T_J = 125^\circ C$ $R_G = 22\Omega$, Non Repetitive	10	μs
P_C	$T_C = 25^\circ C$	190	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ C$
T_{SOLD}	Plastic Body for 10s	260	$^\circ C$
M_d	Mounting Torque (TO-247)	1.13/10	Nm/lb.in
Weight	TO-268	4	g
	TO-247	6	g

Symbol	Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A$, $V_{GE} = 0V$	1700		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$	16N170A		50 μA
		16N170AH1		100 μA
		16N170A		750 μA
		16N170AH1		1.5 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 11A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$	4.0	5.0	V
		4.5		V

Features

- High Blocking Voltage
- International Standard Packages
- Low Conduction Losses
- Anti-Parallel Sonic Diode
- High Blocking Voltage
- High Current Handling Capability

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- AC Choppers
- Capacitor Discharge Circuits
- AC Motor Drives
- DC Servo & Robot Drives

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 16A, V_{CE} = 10V$, Note 1	6.0	12.5	S
C_{ies}	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	16N170A	1500	pF
C_{oes}			99	pF
C_{res}			110	pF
$Q_{g(on)}$	$I_C = 11A, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$	16N170AH1	70	nC
Q_{ge}			9	nC
Q_{gc}			32	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ C$ $I_C = 16A, V_{GE} = 15V$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 10\Omega$ Note 2		12	ns
t_{ri}			22	ns
E_{on}			2.35	mJ
$t_{d(off)}$			200	ns
t_{fi}			35	ns
E_{off}			0.38	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ C$ $I_C = 16A, V_{GE} = 15V$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 10\Omega$ Note 2		13	ns
t_{ri}			22	ns
E_{on}			2.80	mJ
$t_{d(off)}$			210	ns
t_{fi}			88	ns
E_{off}			0.67	mJ
R_{thJC}			0.21	$0.65^\circ C/W$
R_{thCS}				$^\circ C/W$

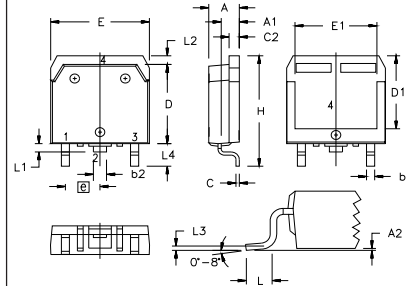
Reverse Sonic Diode (FRD)

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 20A, V_{GE} = 0V$, Note 1	$T_J = 125^\circ C$	2.8	3.4 V
t_{rr}	$I_F = 10A, V_{GE} = 0V,$ $-di_F/dt = 250A/\mu s, V_R = 900V$	$T_J = 125^\circ C$	300	ns
I_{RM}		$T_J = 125^\circ C$	550	ns
I_{RM}		$T_J = 125^\circ C$	13	A
R_{thJC}				1.5 $^\circ C/W$

Notes:

1. Pulse test, $t \leq 300\mu s$, duty cycle, $d \leq 2\%$.
2. Switching times & energy losses may increase for higher V_{CE} (clamp), T_J or R_G .

TO-268 Outline



Terminals: 1 - Gate 2,4 - Collector
3 - Emitter

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

TO-247 Outline

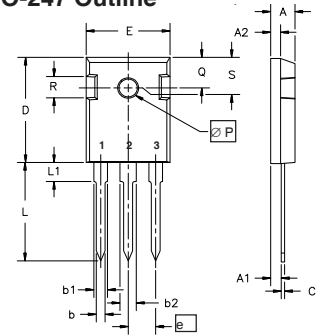


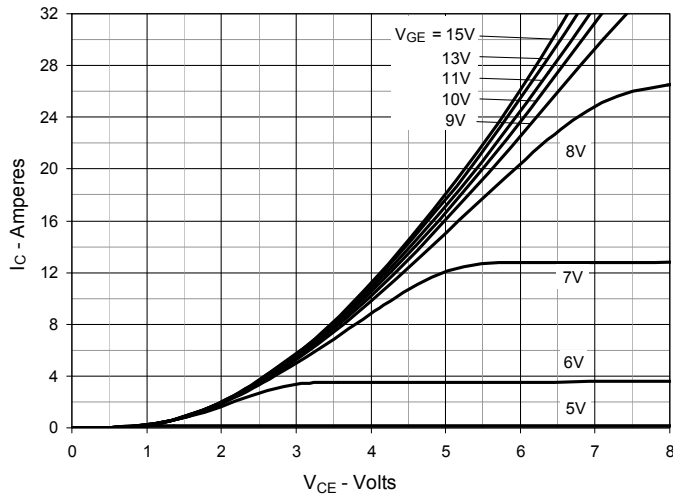
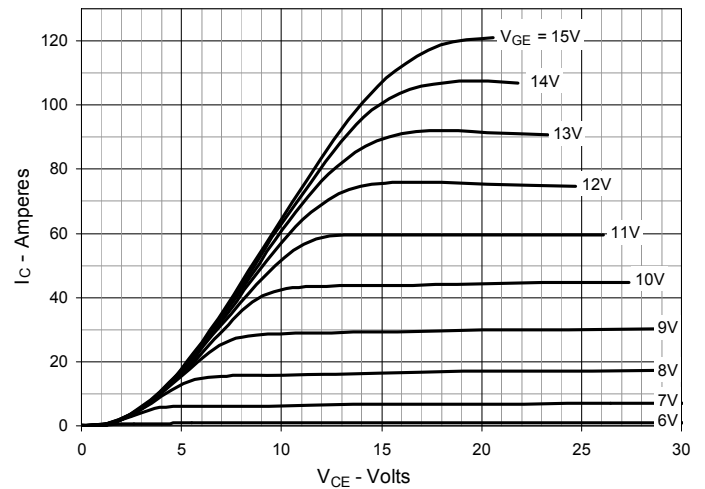
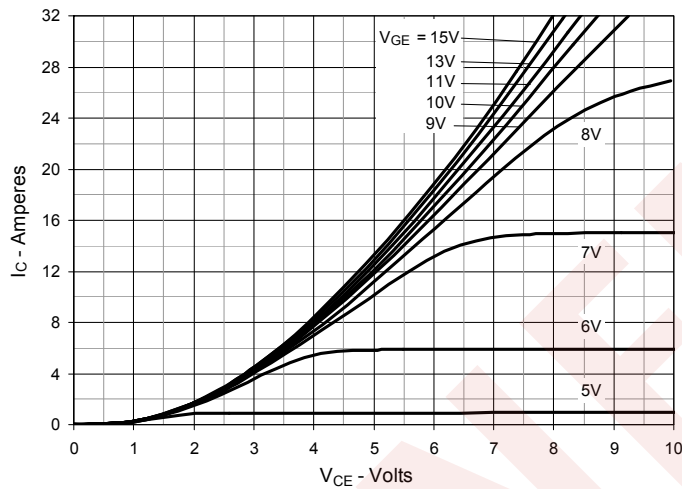
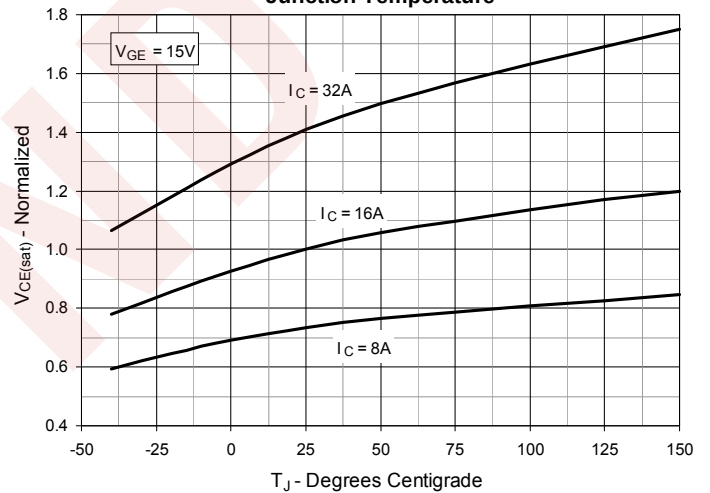
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$ Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$ Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$ Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

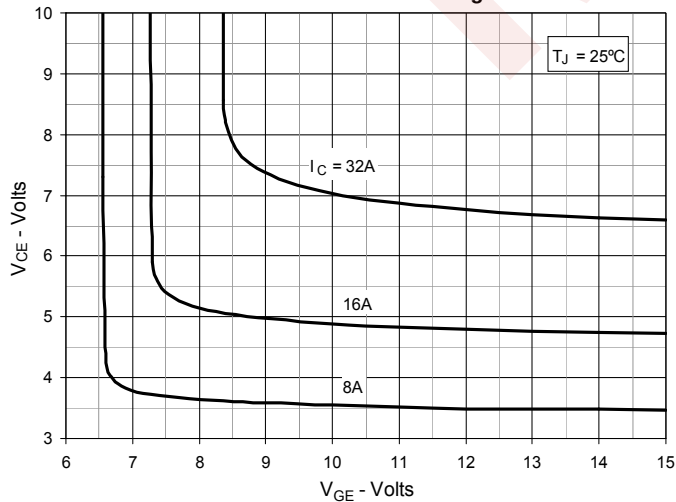


Fig. 6. Input Admittance

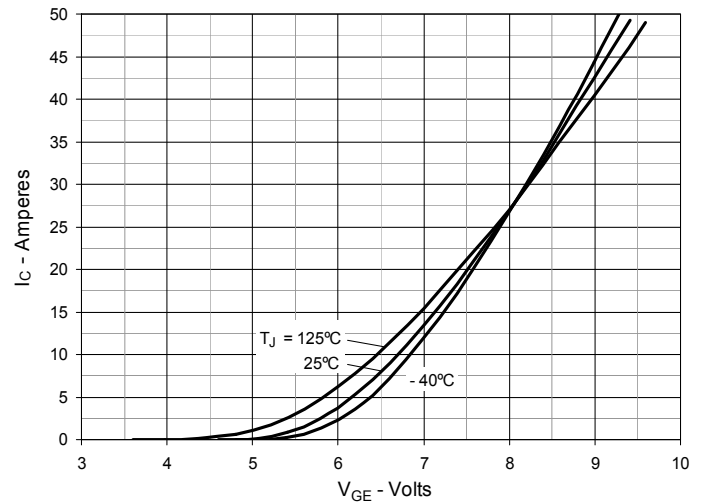


Fig. 7. Transconductance

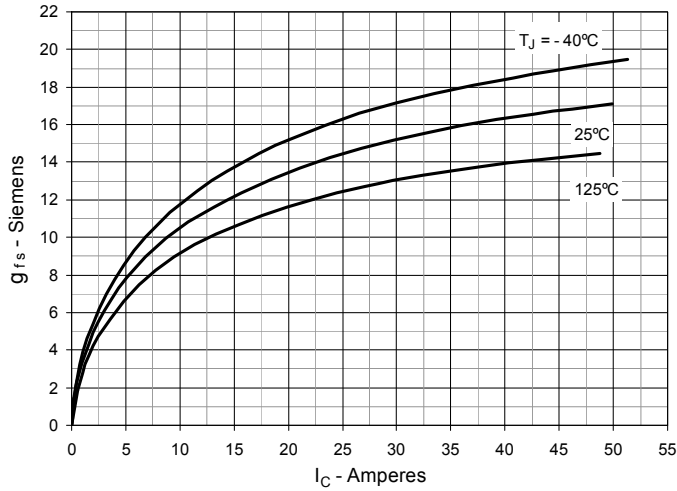


Fig. 8. Gate Charge

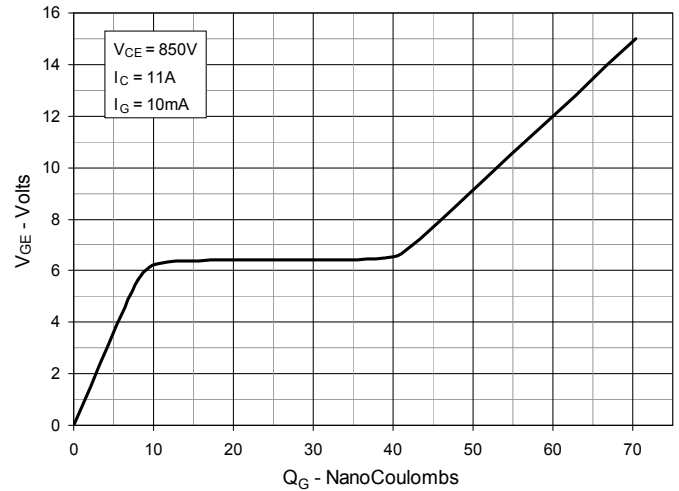


Fig. 9. Capacitance

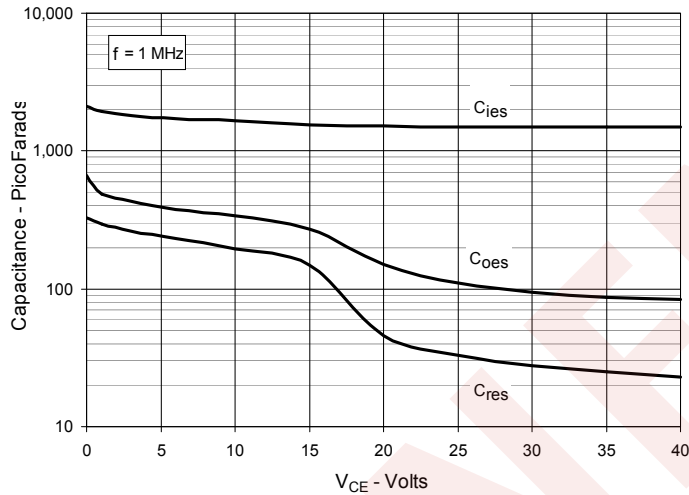


Fig. 10. Reverse-Bias Safe Operating Area

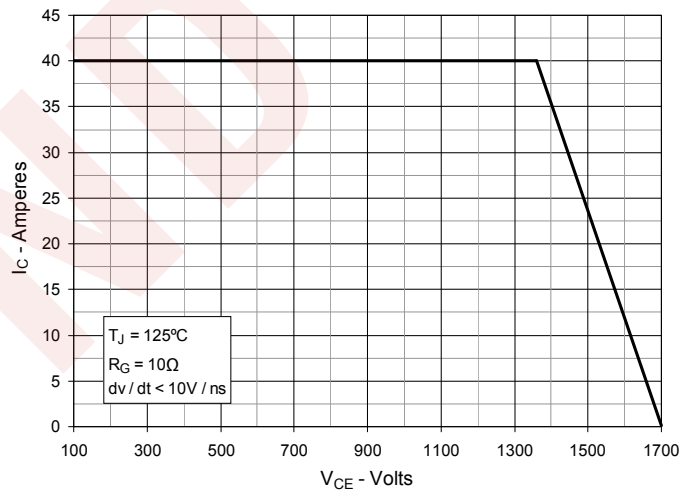


Fig. 11. Maximum Transient Thermal Impedance (IGBT)

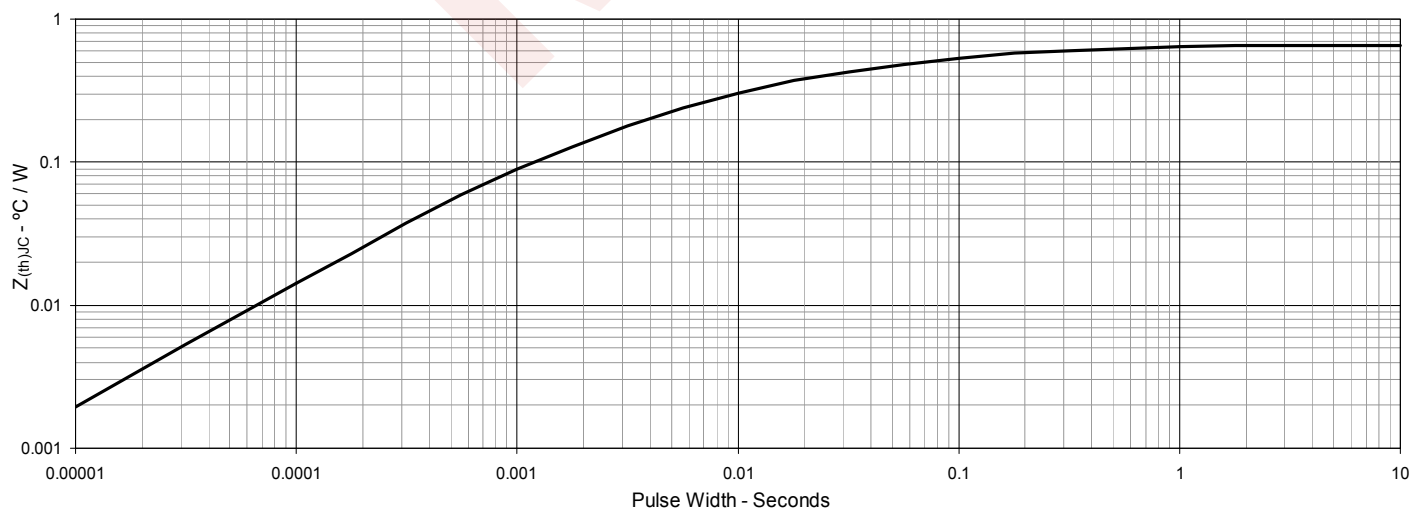


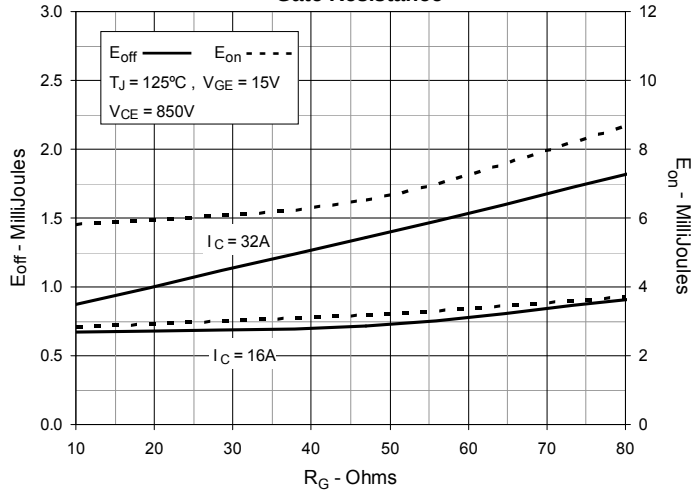
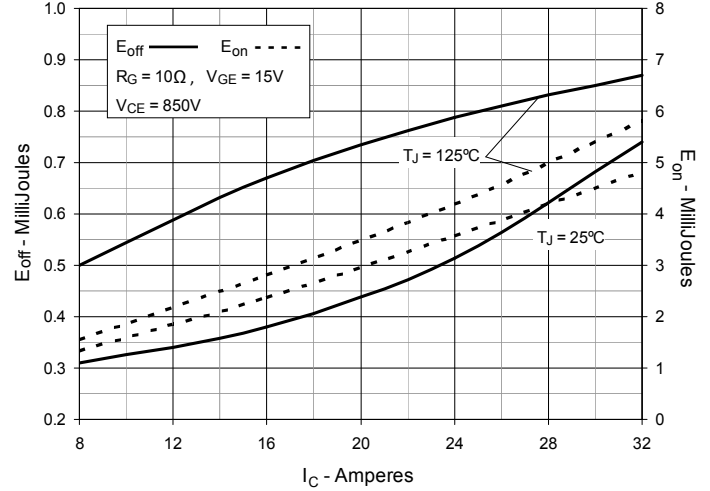
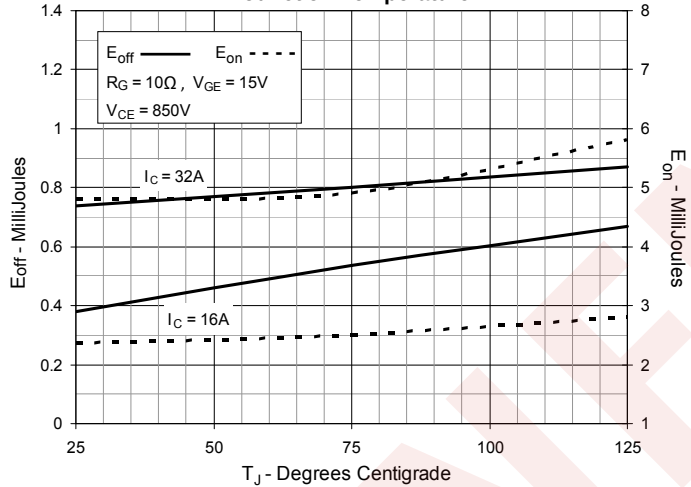
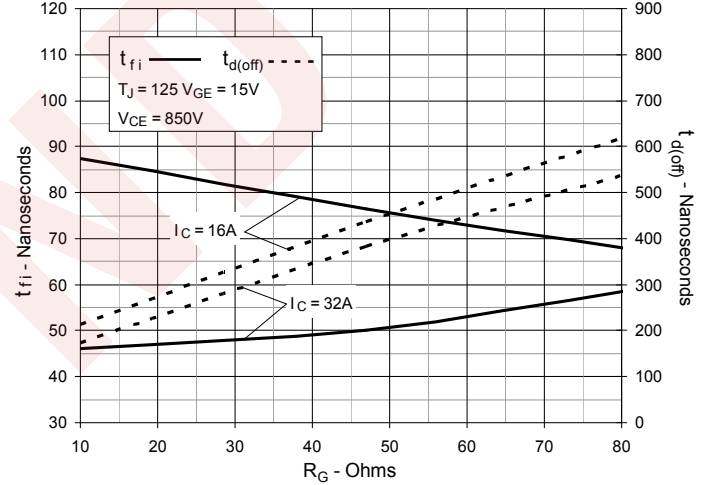
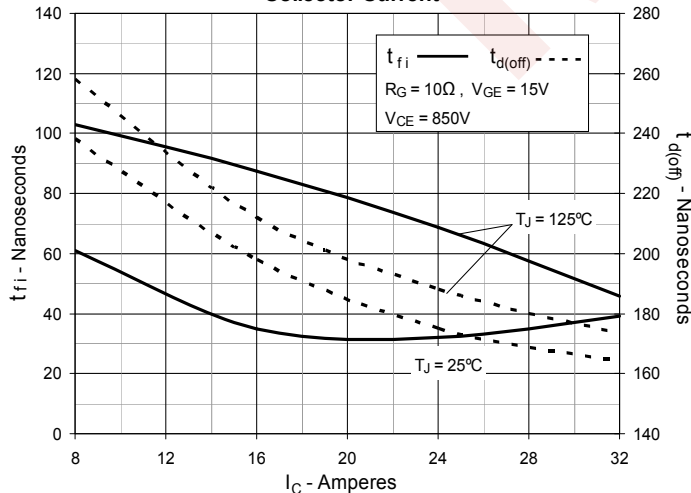
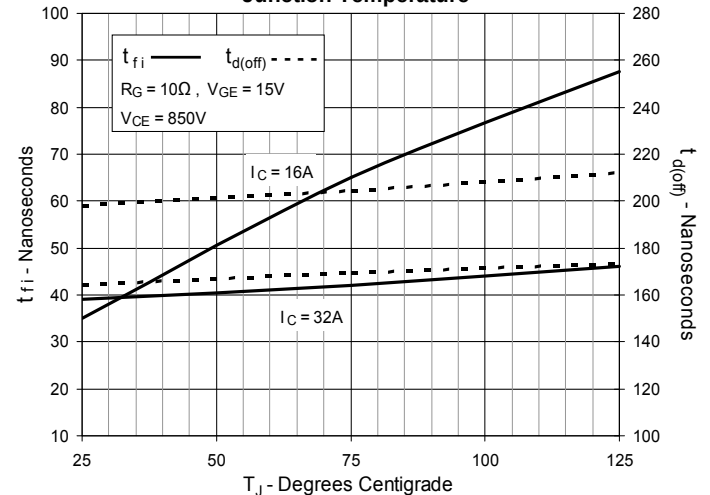
Fig. 12. Inductive Switching Energy Loss vs.
Gate ResistanceFig. 13. Inductive Switching Energy Loss vs.
Collector CurrentFig. 14. Inductive Switching Energy Loss vs.
Junction TemperatureFig. 15. Inductive Turn-off Switching Times vs.
Gate ResistanceFig. 16. Inductive Turn-off Switching Times vs.
Collector CurrentFig. 17. Inductive Turn-off Switching Times vs.
Junction Temperature

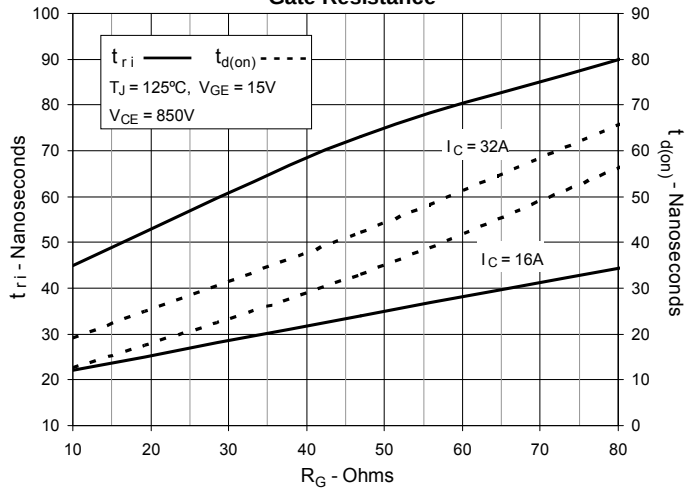
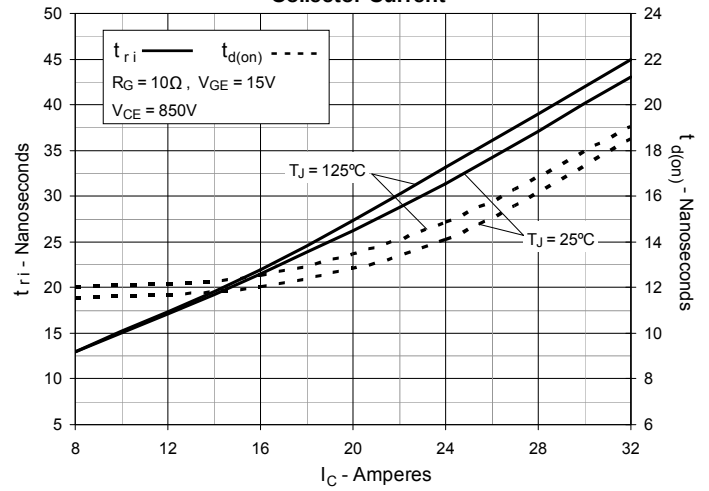
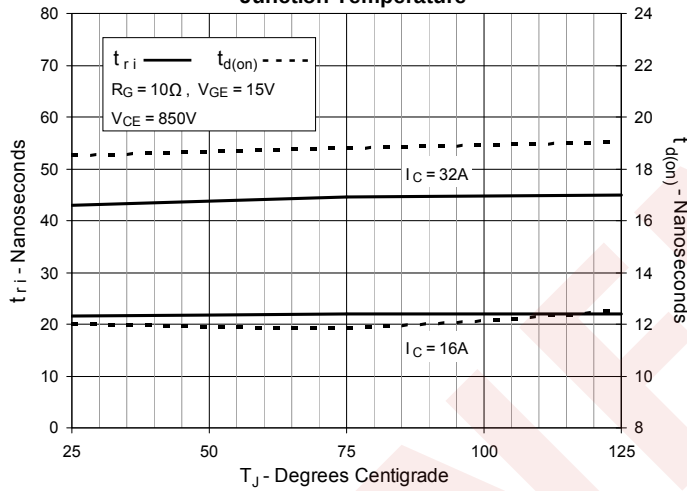
Fig. 18. Inductive Turn-on Switching Times vs.
Gate ResistanceFig. 19. Inductive Turn-on Switching Times vs.
Collector CurrentFig. 20. Inductive Turn-on Switching Times vs.
Junction Temperature

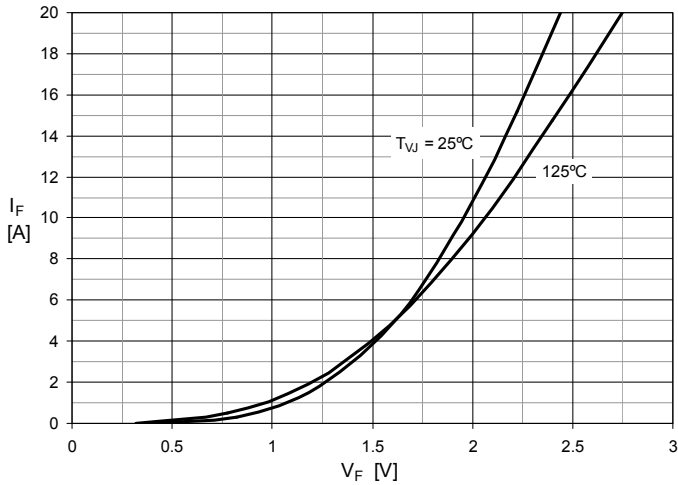
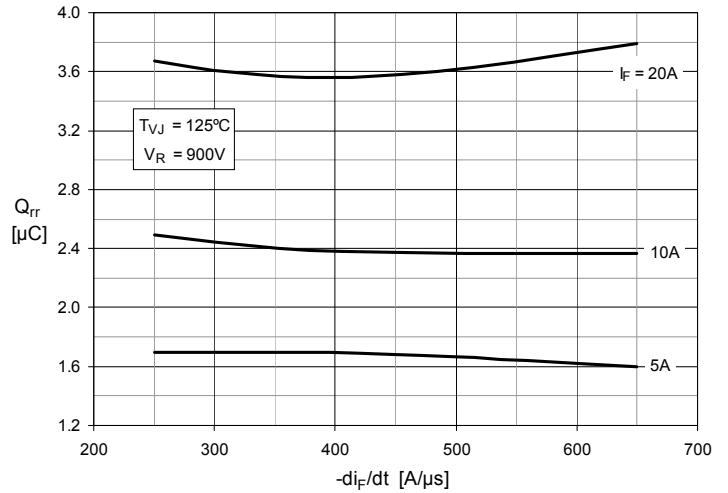
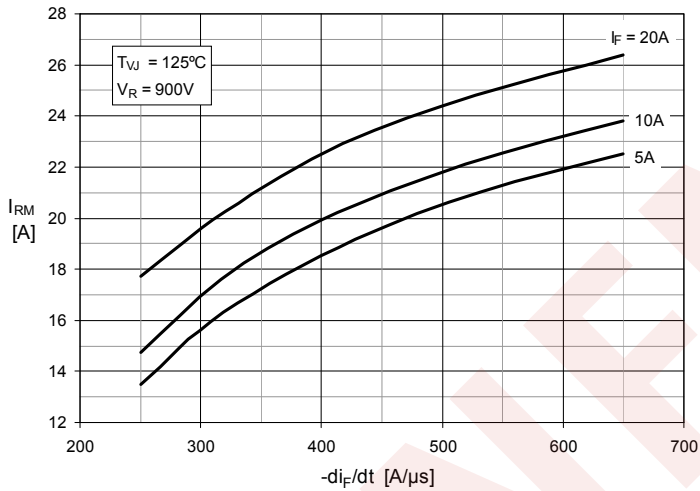
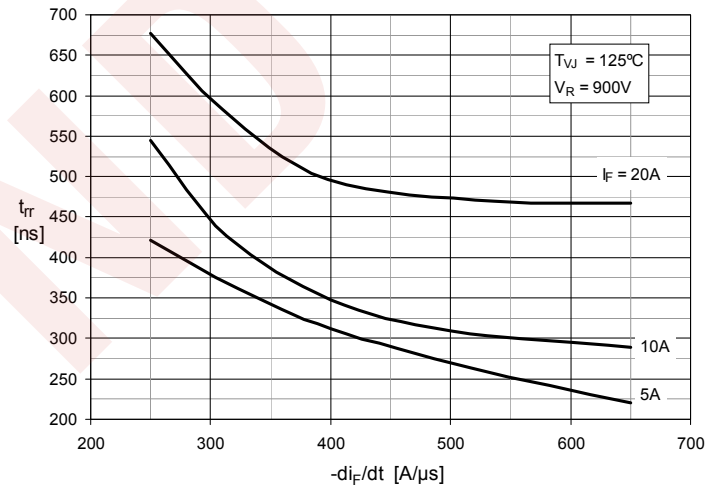
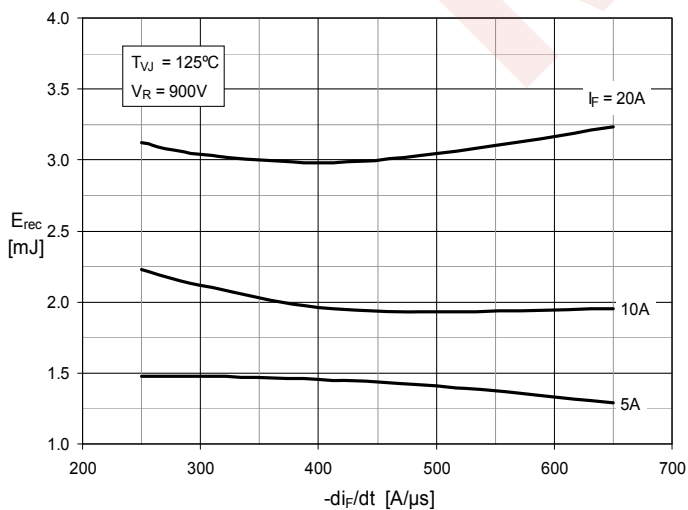
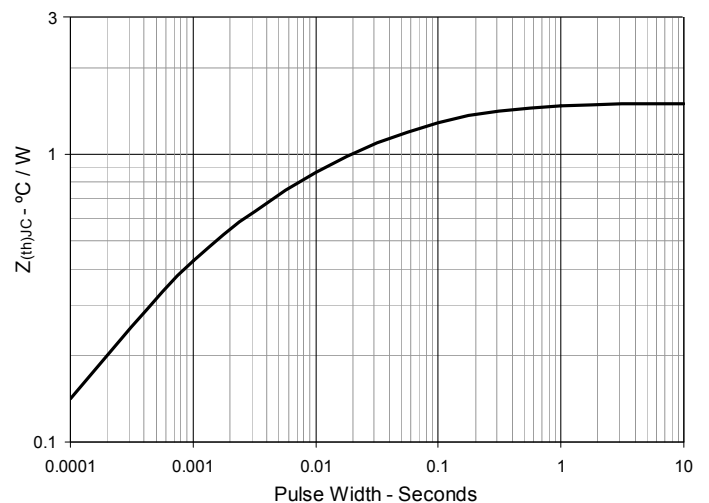
Fig. 21. Forward Current I_F vs V_F Fig. 22. Reverse Recovery Charge Q_{rr} vs. $-di_F/dt$ Fig. 23. Peak Reverse Current I_{RM} vs. $-di_F/dt$ Fig. 24. Recovery Time t_{rr} vs. $-di_F/dt$ Fig. 25. Recovery Energy E_{rec} vs $-di_F/dt$ 

Fig. 26. Maximum Transient Thermal Impedance (Diode)



NOT FOR NEW DESIGN

NEW



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