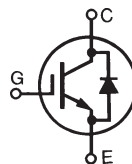


HiPerFAST™ IGBT IXGR 32N90B2D1 with Fast Diode

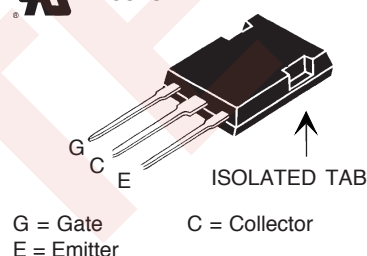
Electrically Isolated Base

$$\begin{aligned} V_{CES} &= 900 \text{ V} \\ I_{C25} &= 47 \text{ A} \\ V_{CE(sat)} &= 2.9 \text{ V} \\ t_{fi\text{typ}} &= 150 \text{ ns} \end{aligned}$$



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	900	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1 \text{ M}\Omega$	900	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	47	A
I_{C110}	$T_C = 110^\circ\text{C}$	22	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1 ms	200	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 10 \Omega$ Clamped inductive load: $V_{CL} < 600 \text{ V}$	$I_{CM} = 64$	A
P_C	$T_C = 25^\circ\text{C}$	160	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
V_{ISOL}	50/60Hz, RMS, $T = 1$ minute $I_{isol} < 1 \text{ mA}$	2500 3000	V~ V~
F_C	Mounting force	20..120/4.5..26	N/lb
Weight		5	g

ISOPLUS247 (IXGR)
E153432



Features

- Electrically isolated mounting tab
- High frequency IGBT
- High current handling capability
- MOS Gate turn-on - drive simplicity

Applications

- PFC circuits
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

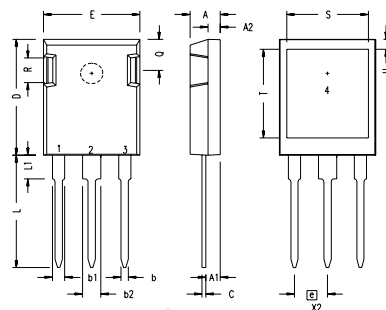
Advantages

- High power density
- Very fast switching speeds for high frequency applications

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$ unless otherwise specified)		
		min.	typ.	max.
$V_{GE(th)}$	$I_C = 250 \mu\text{A}$, $V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$ $T_J = 150^\circ\text{C}$			300 μA 1.5 mA
I_{GES}	$V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_T$, $V_{GE} = 15 \text{ V}$, Note 1 $T_J = 125^\circ\text{C}$		2.1	2.9 V V

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$ unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$I_C = I_T; V_{CE} = 10\text{ V},$	18	28	S
C_{ies}	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		1790	pF
C_{oes}			146	pF
C_{res}			49	pF
Q_g	$I_C = I_T, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		89	nC
Q_{ge}			15	nC
Q_{gc}			34	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_T, V_{GE} = 15\text{ V}$ $V_{CE} = 720\text{ V}, R_G = R_{off} = 5\ \Omega$		20	ns
t_{ri}			22	ns
$t_{d(off)}$			260	400 ns
t_{fi}			150	ns
E_{off}			2.2	4.5 mJ
$t_{d(on)}$			20	ns
t_{ri}	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_T, V_{GE} = 15\text{ V}$ $V_{CE} = 720\text{ V}, R_G = R_{off} = 5\ \Omega$		22	ns
E_{on}			3.8	mJ
$t_{d(off)}$			360	ns
t_{fi}			330	ns
E_{off}			5.75	mJ
R_{thJC}			0.8	KW
R_{thCS}			0.15	KW

ISOPLUS247 Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

- 1- GATE
2- COLLECTOR/CATHODE
3- EMITTER/ANODE
4- NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

Ultrafast Diode

Symbol	Conditions	Maximum Ratings	
I_{FRMS}		60	A
I_{F110}	$T_C = 110^\circ\text{C}$	22	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 30\text{ A}$ $T_{VJ} = 125^\circ\text{C}$		1.8	2.75 V
I_{RM}	$I_F = 50\text{ A}; di_F/dt = -100\text{ A}/\mu\text{s}; T_{VJ} = 100^\circ\text{C}$		5.5	11.4 A
t_{rr}	$V_R = 100\text{ V}; V_{GE} = 0\text{ V}$		190	ns
R_{thJC}			0.15	1.1 K/W
R_{thCS}				K/W

Notes:

1. Pulse test: Pulse width < 300 μs , duty cycle < 2 %;
2. Test current $I_T = 32\text{ A}$.

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IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2

Fig. 1. Output Characteristics
@ 25 °C

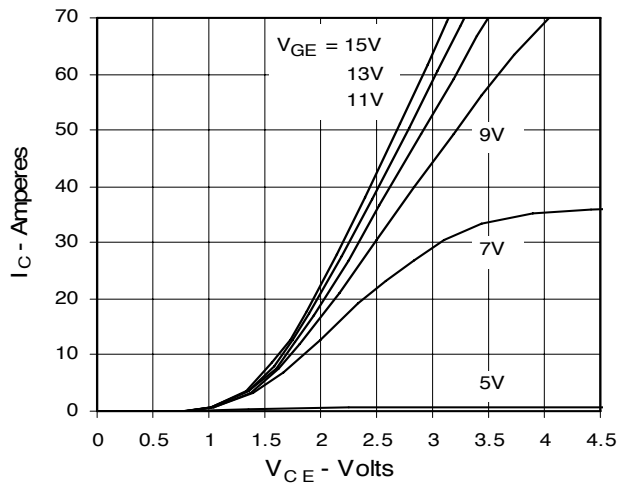


Fig. 2. Extended Output Characteristics
@ 25 °C

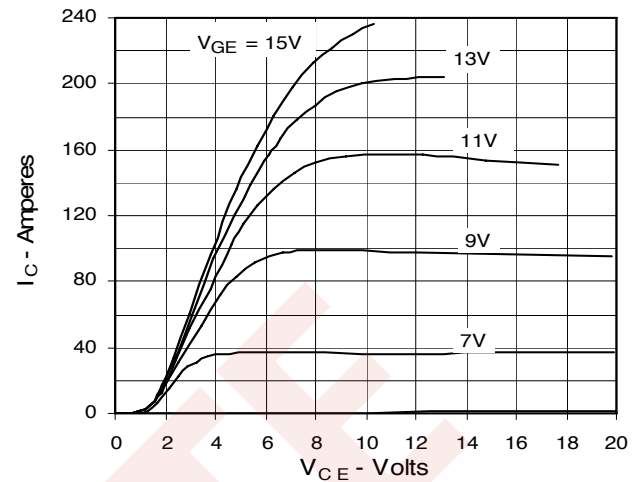


Fig. 3. Output Characteristics
@ 125 °C

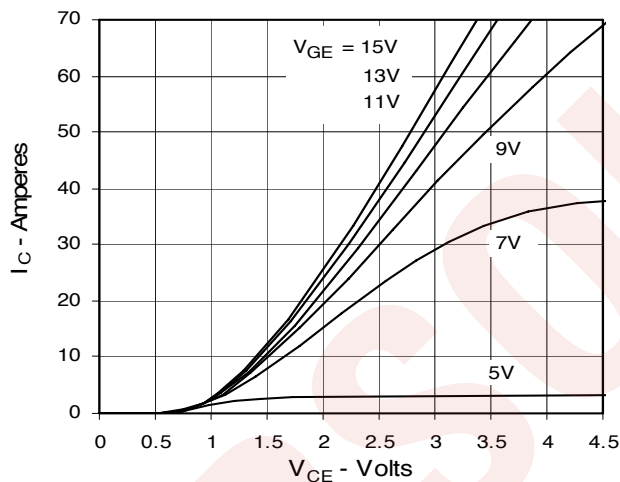


Fig. 4. Dependence of $V_{CE(sat)}$ on Temperature

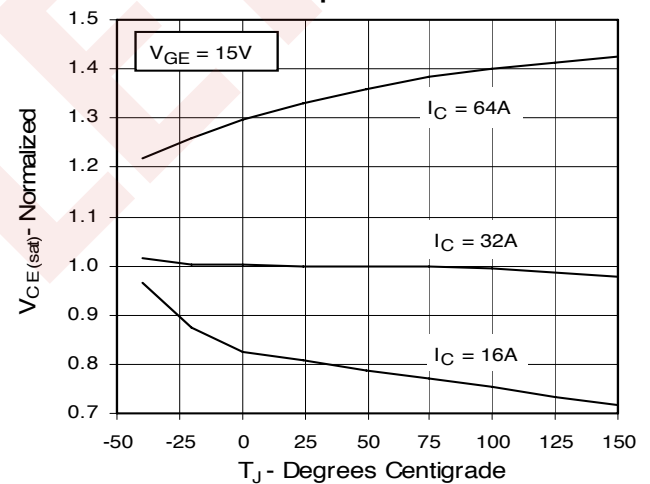


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

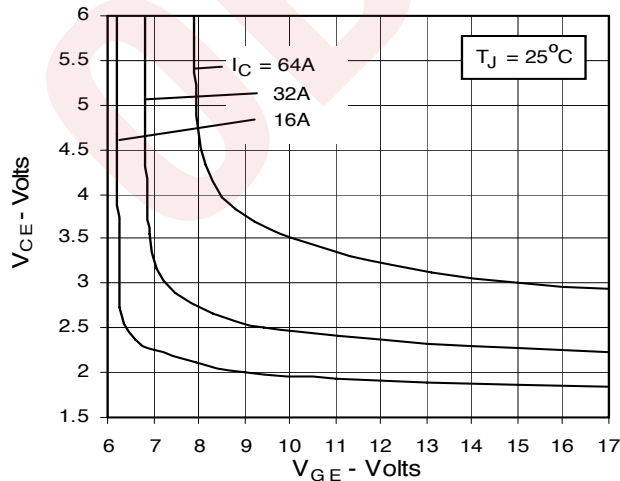


Fig. 6. Input Admittance

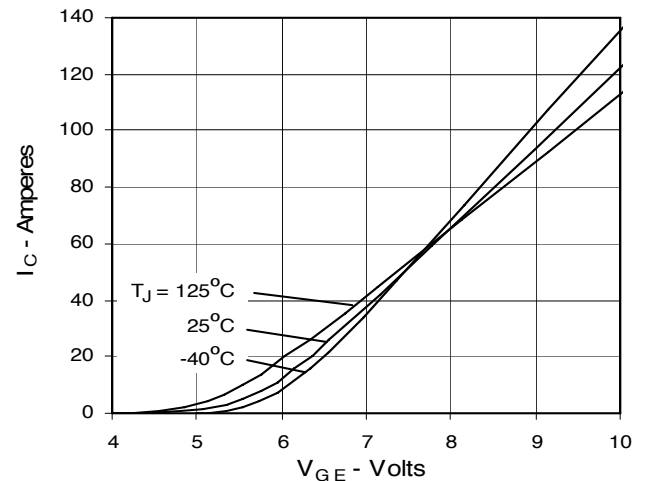


Fig. 7. Transconductance

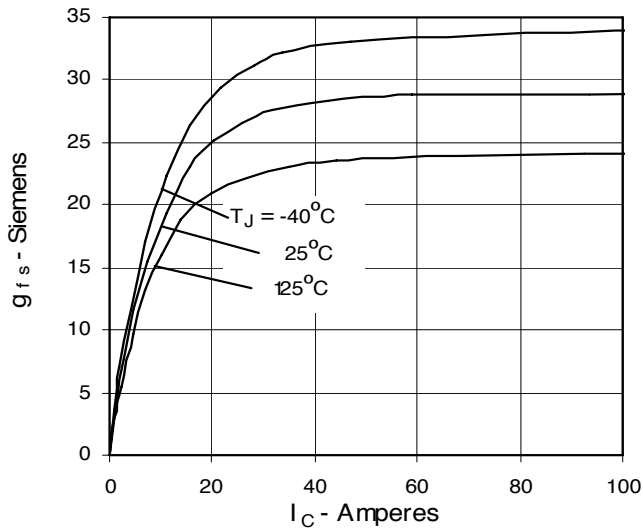


Fig. 8. Gate Charge

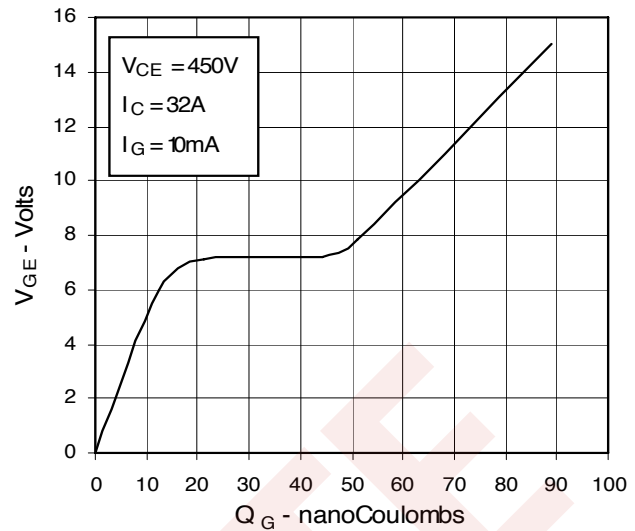


Fig. 9. Capacitance

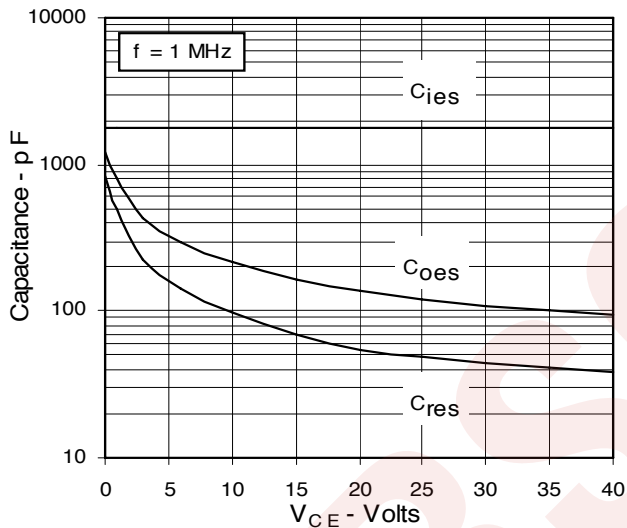


Fig. 10. Reverse-Bias Safe Operating Area

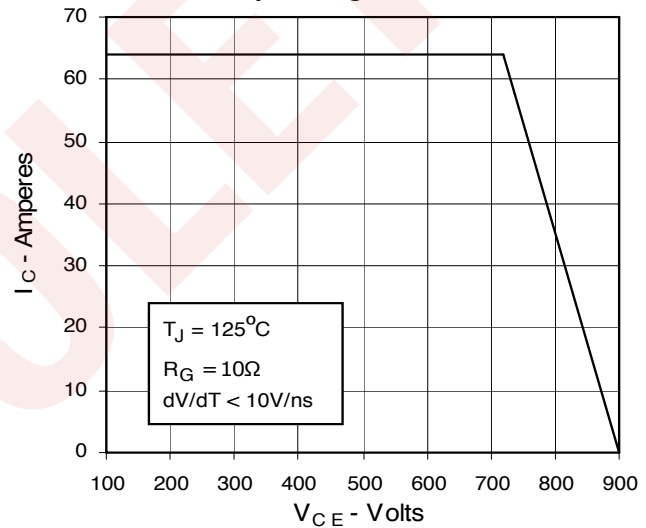
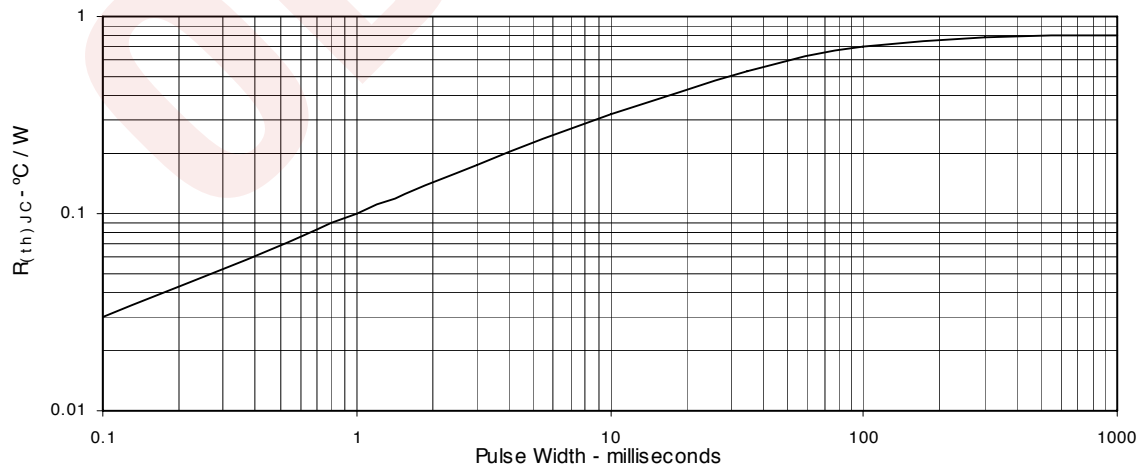


Fig. 11. Maximum Transient Thermal Resistance



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4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2

Fig. 12. Dependence of Turn-off Energy Loss on Gate Resistance

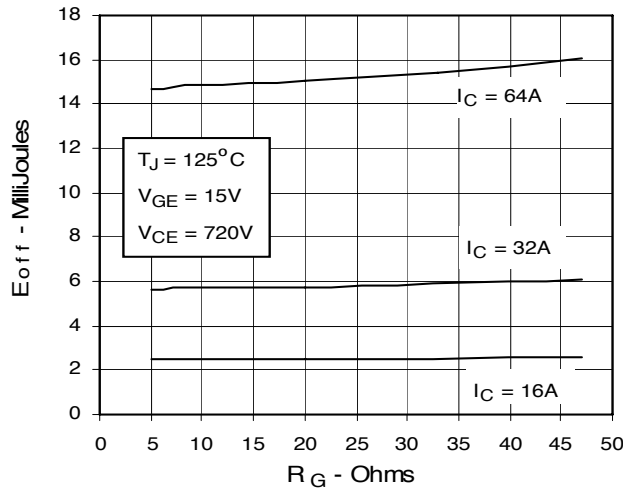


Fig. 13. Dependence of Turn-on Energy Loss on Gate Resistance

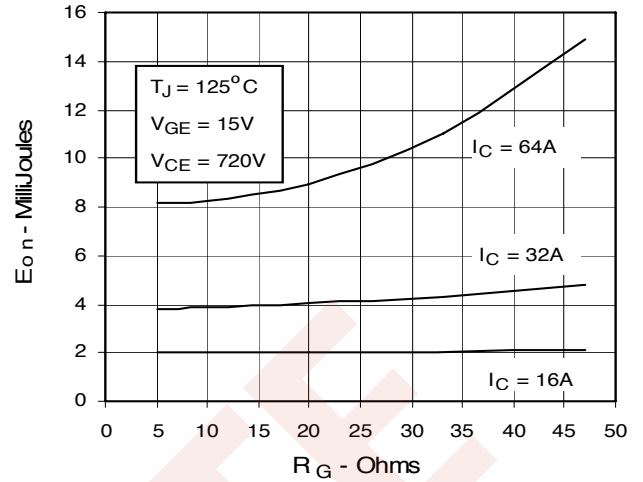


Fig. 14. Dependence of Turn-off Energy Loss on Collector Current

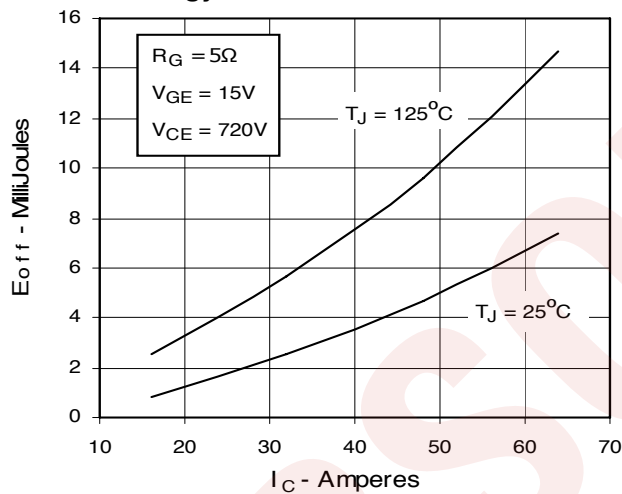


Fig. 15. Dependence of Turn-on Energy Loss on Collector Current

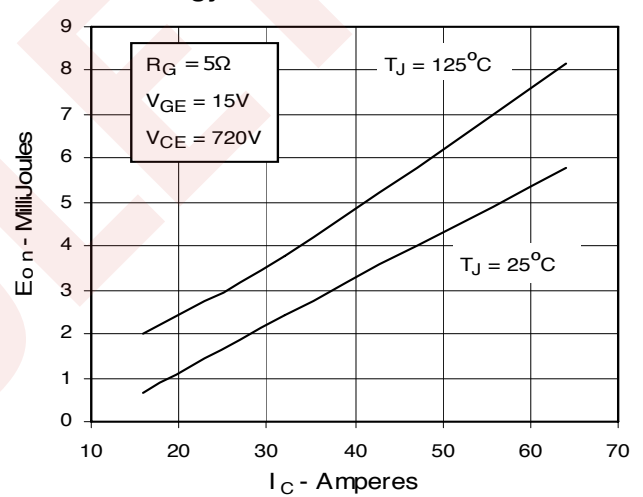


Fig. 16. Dependence of Turn-off Energy Loss on Temperature

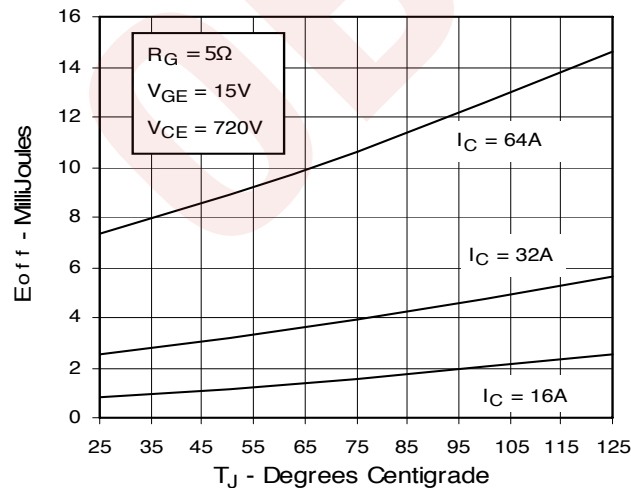


Fig. 17. Dependence of Turn-on Energy Loss on Temperature

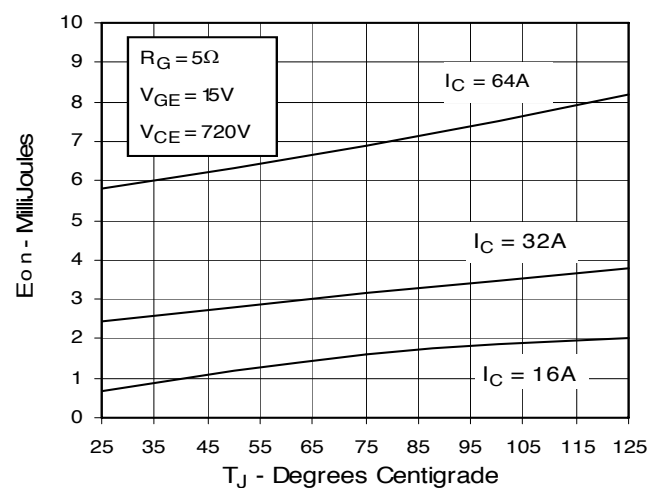


Fig. 18. Dependence of Turn-off Switching Time on Gate Resistance

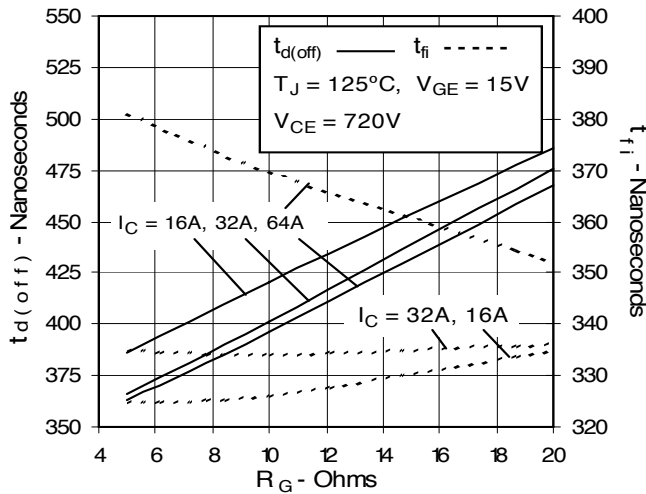


Fig. 19. Dependence of Turn-on Switching Time on Gate Resistance

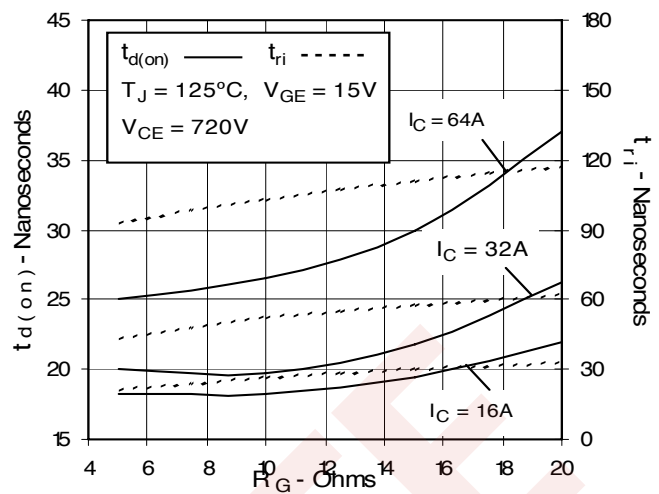


Fig. 20. Dependence of Turn-off Switching Time on Collector Current

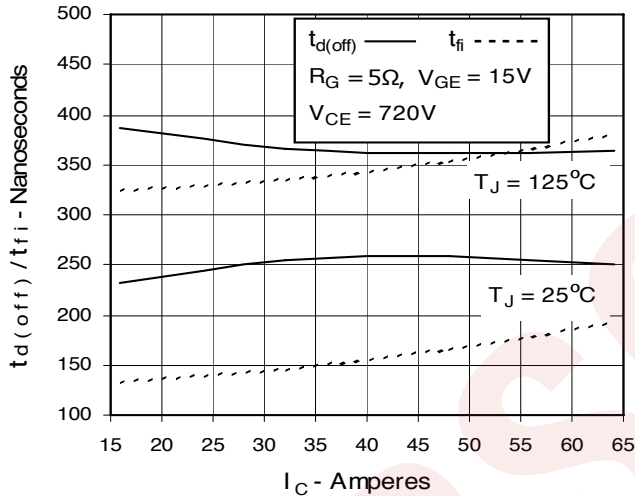


Fig. 21. Dependence of Turn-on Switching Time on Collector Current

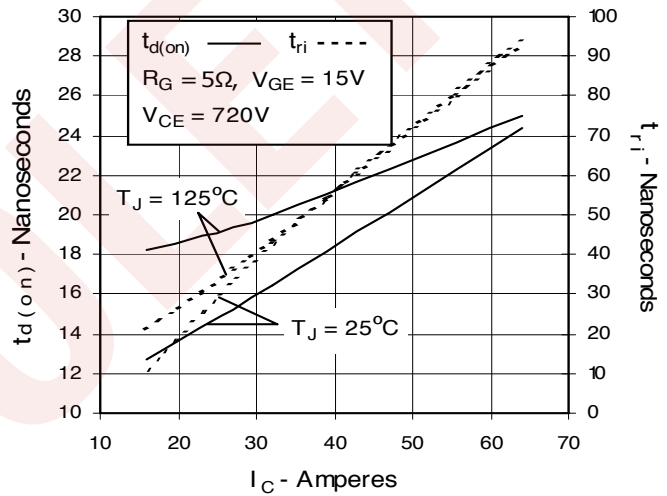


Fig. 22. Dependence of Turn-off Switching Time on Temperature

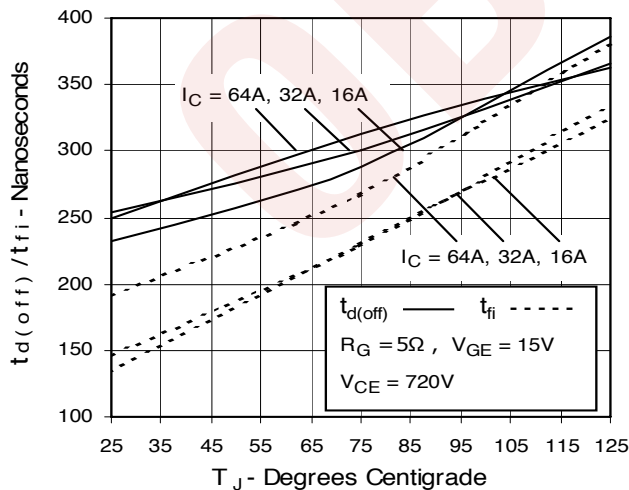
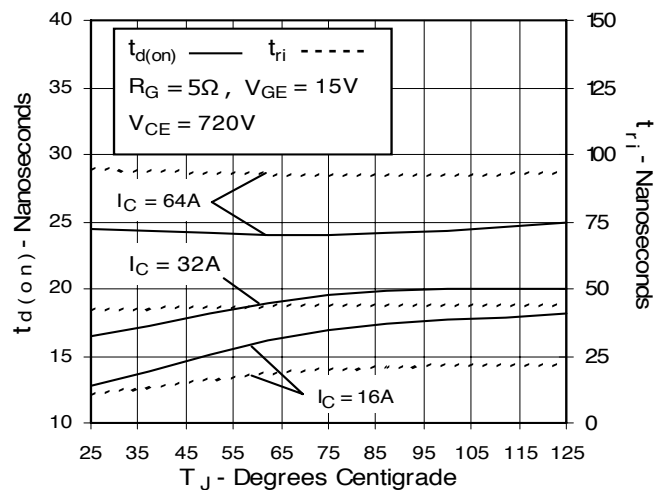


Fig. 23. Dependence of Turn-on Switching Time on Temperature



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	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2

Ultrafast Diode Characteristics

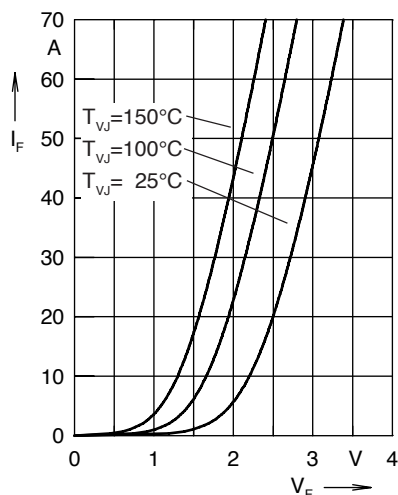
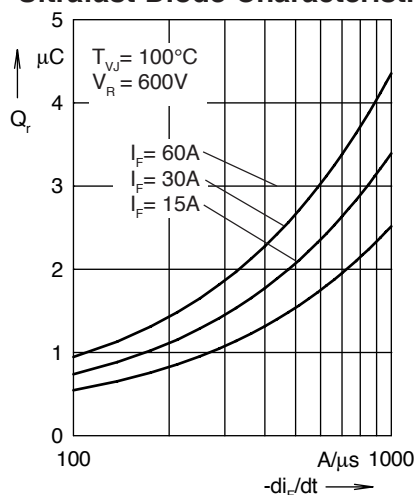
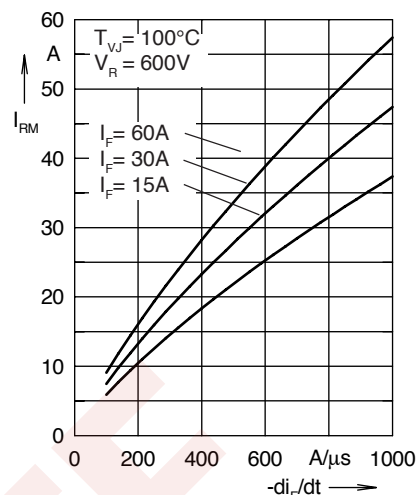
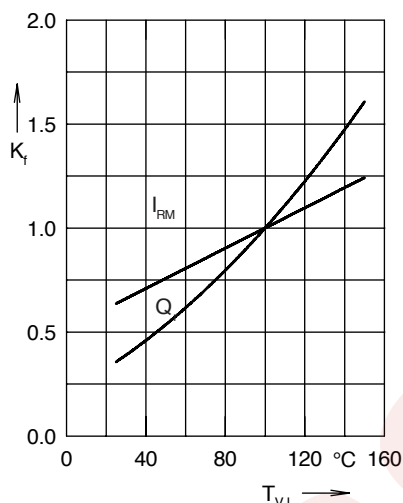
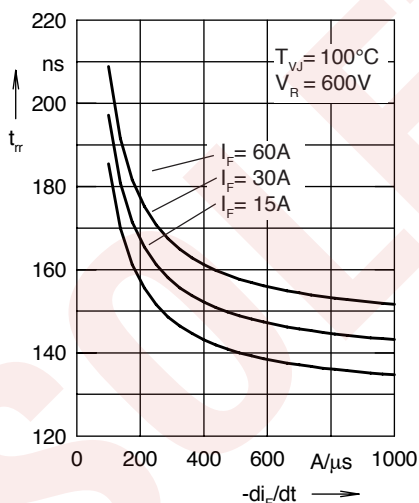
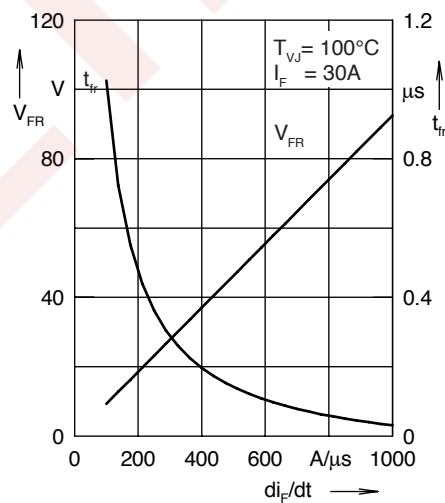
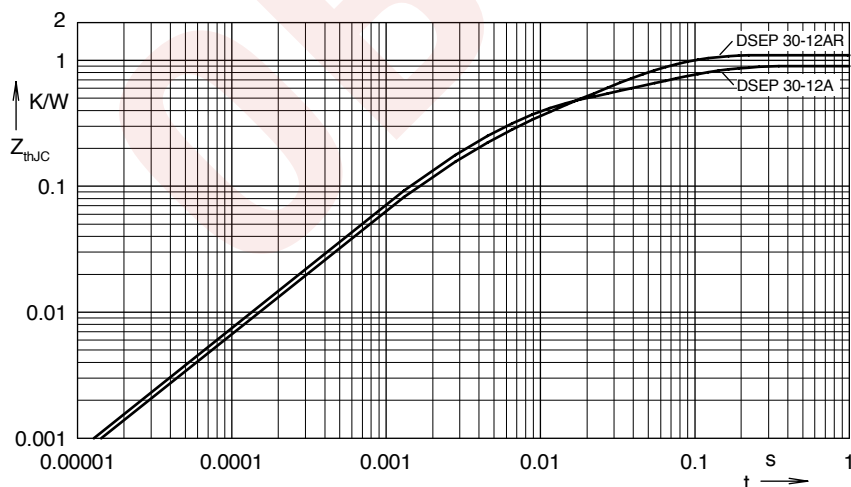
Fig. 24. Forward current I_F versus V_F Fig. 25. Reverse recovery charge Q_r versus $-di_F/dt$ Fig. 26. Peak reverse current I_{RM} versus $-di_F/dt$ Fig. 27. Dynamic parameters Q_r , I_{RM} versus T_{VJ} Fig. 28. Recovery time t_{rr} versus $-di_F/dt$ Fig. 29. Peak forward voltage V_{FR} and t_{rr} versus di_F/dt 

Fig. 30. Transient thermal resistance junction-to-case

Constants for Z_{thJC} calculation for non-isolated diode (DSEP 30-12A):

i	R_{thi} (K/W)	t_i (s)
1	0.465	0.0052
2	0.179	0.0003
3	0.256	0.0397

Constants for Z_{thJC} calculation for isolated diode (DSEP 30-12AR):

i	R_{thi} (K/W)	t_i (s)
1	0.368	0.0052
2	0.1417	0.0003
3	0.0295	0.0004
4	0.5604	0.0092

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