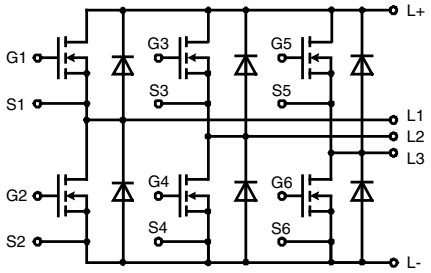
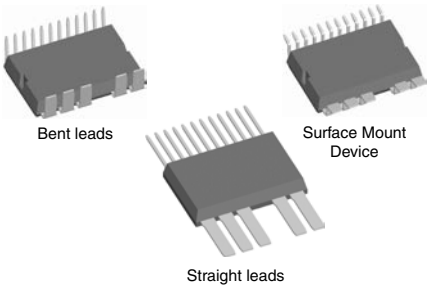
Three phase full Bridge

with Trench MOSFETs
in DCB isolated high current package

V_{DSS} = 55 V
I_{D25} = 160 A
$R_{DSon\ typ.}$ = 2.0 mΩ





MOSFETs

Symbol	Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	55	V
V_{GS}		± 20	V
I_{D25}	T_C = 25°C	160	A
I_{D90}	T_C = 90°C	120	A
I_{F25}	T_C = 25°C (diode)	135	A
I_{F90}	T_C = 90°C (diode)	90	A

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
R_{DSon} [1]	on chip level at V_{GS} = 10 V; I_D = 100 A; T_J = 25°C		2.0	3.0	mΩ
	T_J = 125°C		3.4		mΩ
$V_{GS(th)}$	V_{DS} = 20 V; I_D = 1 mA	2		4	V
I_{DSS}	V_{DS} = V_{DSS}; V_{GS} = 0 V; T_J = 25°C			1	µA
	T_J = 125°C		0.1		mA
I_{GSS}	V_{GS} = ± 20 V; V_{DS} = 0 V			0.2	µA
Q_g	V_{GS} = 10 V; V_{DS} = 12 V; I_D = 160 A		90		nC
Q_{gs}			18		nC
Q_{gd}			25		nC
$t_{d(on)}$	inductive load V_{GS} = 10 V; V_{DS} = 24 V; I_D = 100 A; R_G = 39 Ω; T_J = 125°C		95		ns
t_r			105		ns
$t_{d(off)}$			500		ns
t_f			110		ns
E_{on}			0.12		mJ
E_{off}			0.52		mJ
E_{recoff}			0.012		mJ
R_{thJC}				0.9	K/W
R_{thJH}	with heat transfer paste		1.2		K/W

[1] $V_{DS} = I_D \cdot (R_{DS(on)} + 2R_{Pin\ to\ Chip})$

Applications

AC drives
- in automobiles
  - electric power steering
  - starter generator
- in industrial vehicles
  - propulsion drives
  - fork lift drives
- in battery supplied equipment

Features

- MOSFETs in trench technology:
  - low RDSon
  - optimized intrinsic reverse diode
- package:
  - high level of integration
  - high current capability 300 A max.
  - aux. terminals for MOSFET control
  - terminals for soldering or welding connections
  - isolated DCB ceramic base plate with optimized heat transfer
- Space and weight savings

Package options

- 3 lead forms available
  - straight leads (SL)
  - SMD lead version (SMD)
  - bent leads (BL)

Source-Drain Diode

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_{SD}	(diode) I_F = 100 A; V_{GS} = 0 V		0.9	1.2	V
t_{rr}	I_F = 100 A; -di_F/dt = 800 A/µs; V_R = 24 V		60		ns
Q_{RM}			0,65		µC
I_{RM}			20		A

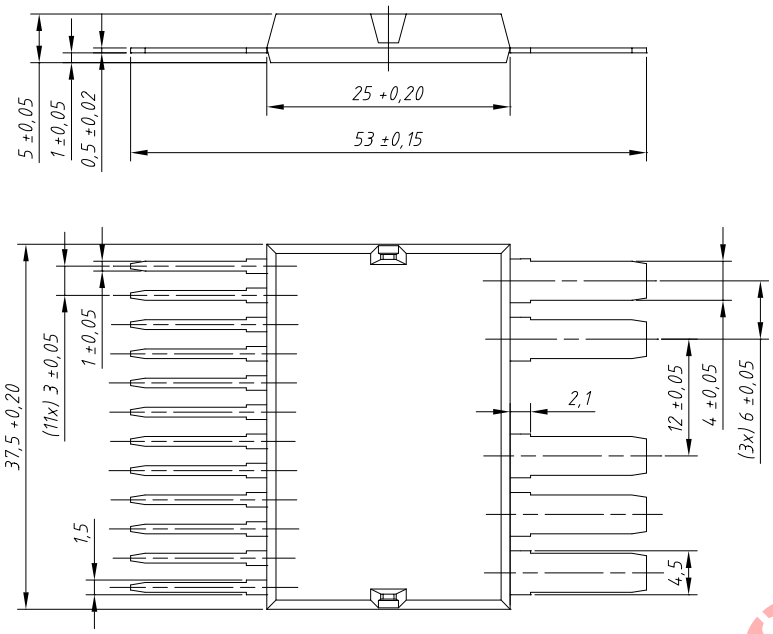
Component

Symbol	Conditions	Maximum Ratings	
I_{RMS}	per pin in main current paths (P+, N-, L1, L2, L3) may be additionally limited by external connections	300	A
T_J		-40...+175	°C
T_{stg}		-55...+125	°C
V_{ISOL}	I_{ISOL} ≤ 1 mA, 50/60 Hz, f = 1 minute	1000	V~
F_C	mounting force with clip	50 - 250	N

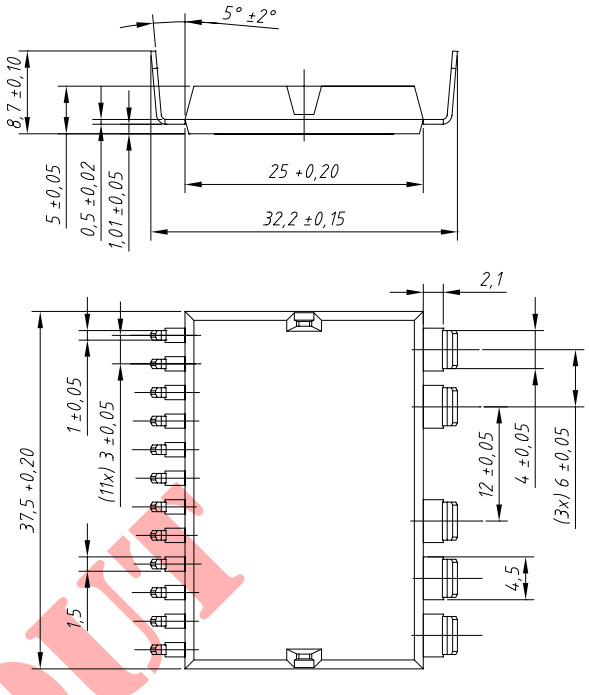
Symbol	Conditions	Characteristic Values min.	typ.	max.	
$R_{pin\ to\ chip}$ [1)]			0.6		mΩ
C_P	coupling capacity between shorted pins and mounting tab in the case		160		pF
Weight			25		g

[1)] $V_{DS} = I_D \cdot (R_{DS(on)} + 2R_{Pin\ to\ Chip})$

Straight Leads GWM 160-0055P3-SL

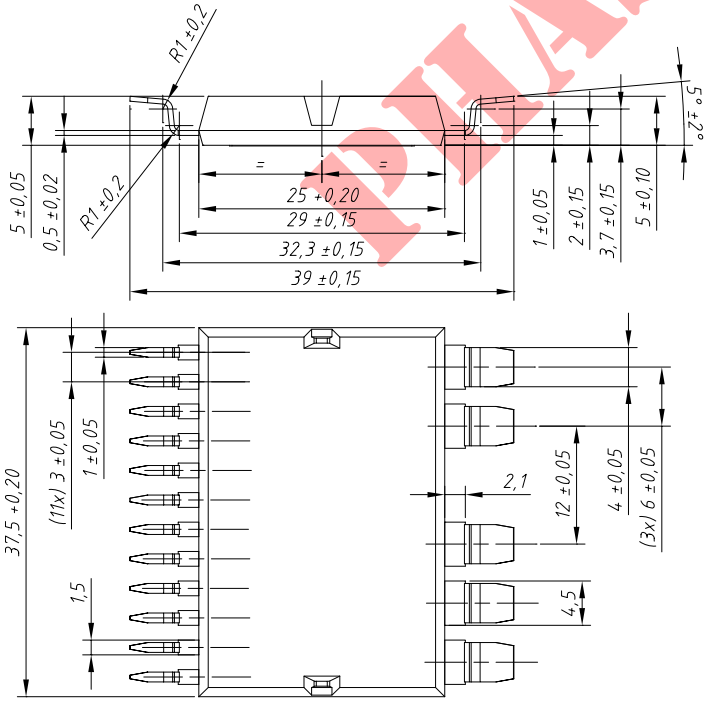


Bent Leads GWM 160-0055P3-BL



Leads	Ordering Code & Packing Unit Marking	Part Marking	Code Key
Straight	GWM 160-0055P3 - SL	GWM 160-0055P3	502 829
SMD	GWM 160-0055P3 - SMD	GWM 160-0055P3	502 836
Bent	GWM 160-0055P3 - BL	GWM 160-0055P3	contact factory

Surface Mount Device
GWM 160-0055P3-SMD



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IXYS reserves the right to change limits, test conditions and dimensions.

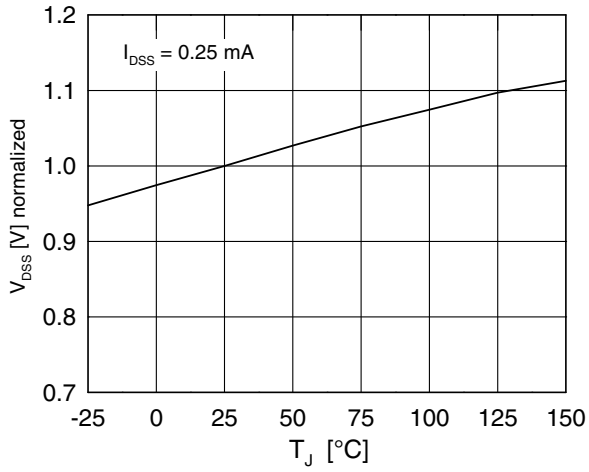

Fig. 1 Drain source breakdown voltage V_{DSS} vs. junction temperature T_J

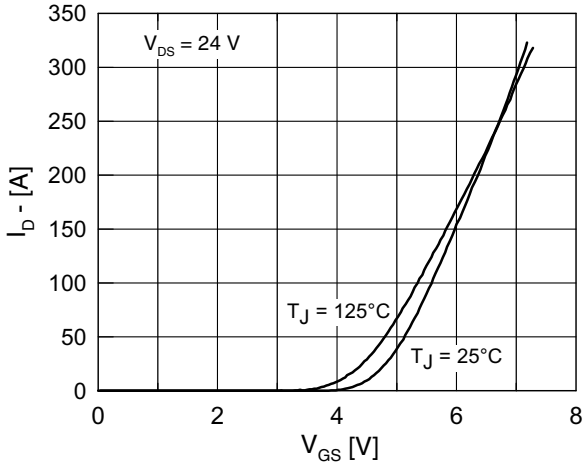

Fig. 2 Typical transfer characteristic

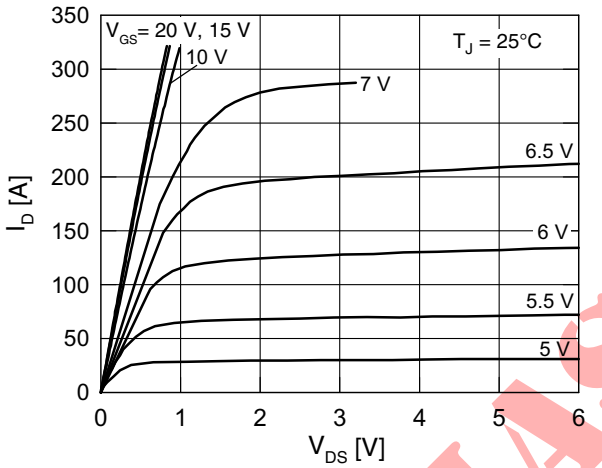

Fig. 3 Typical output characteristic

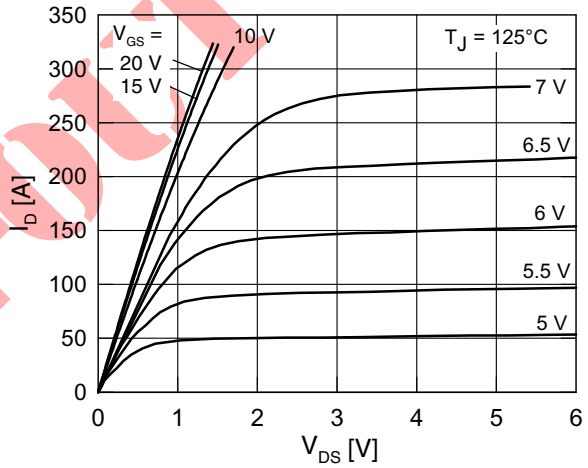

Fig. 4 Typical output characteristic

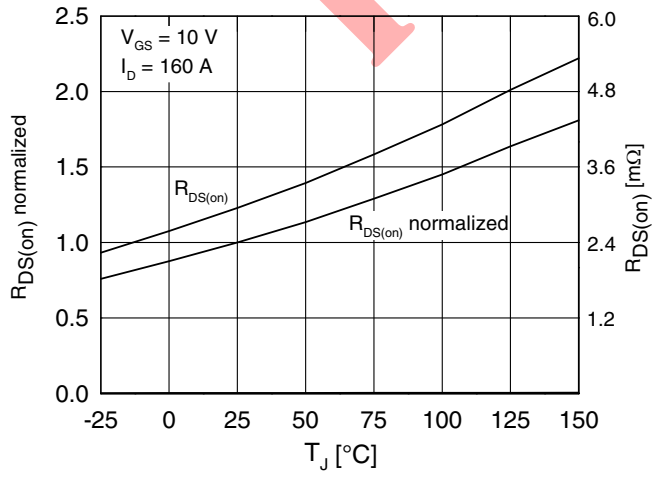

Fig. 5 Drain source on-state resistance $R_{DS(on)}$ versus junction temperature T_J

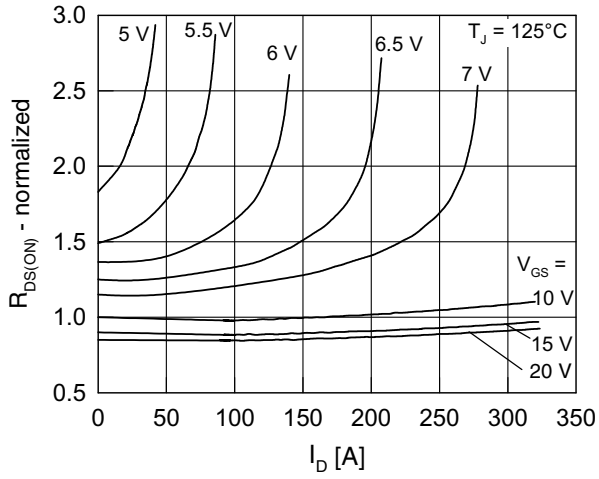

Fig. 6 Drain source on-state resistance $R_{DS(on)}$ versus I_D

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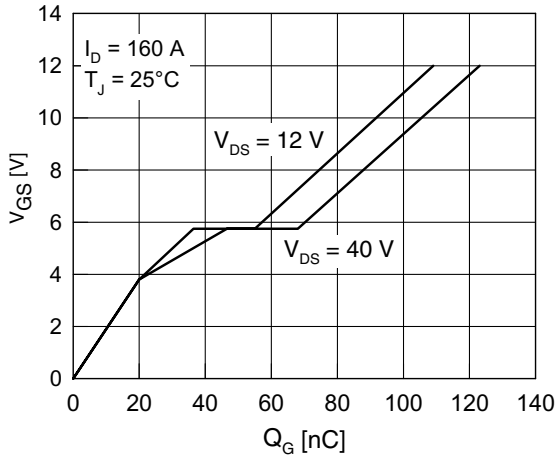

Fig.7 Gate charge characteristic

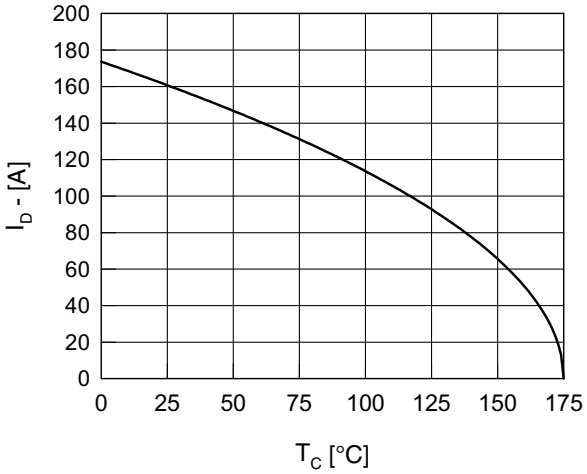

Fig. 8 Drain current I_D vs. case temperature T_C

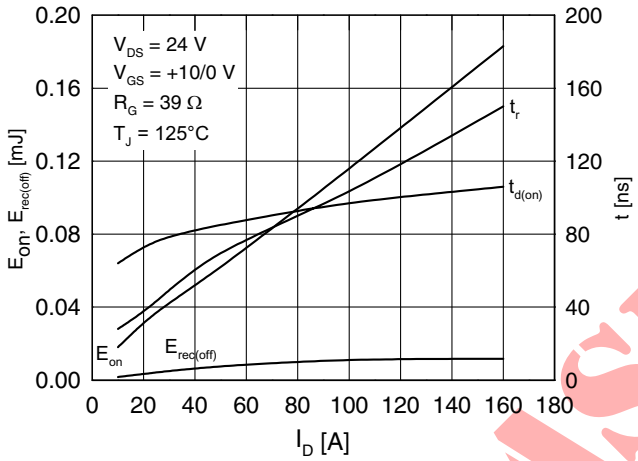

Fig. 9 Typ. turn-on energy & switching times vs. collector current, inductive switching

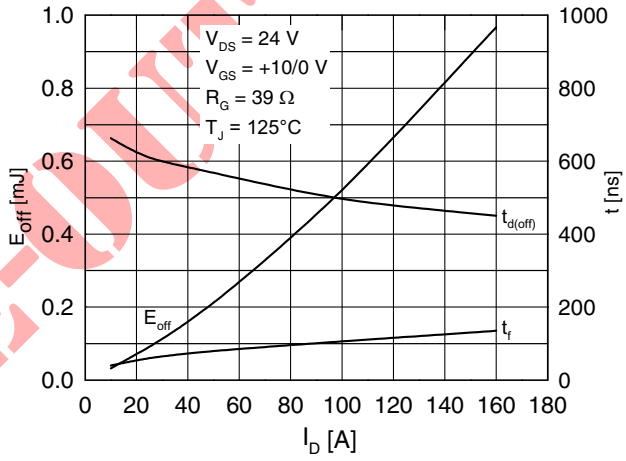

Fig. 10 Typ. turn-off energy & switching times vs. collector current, inductive switching

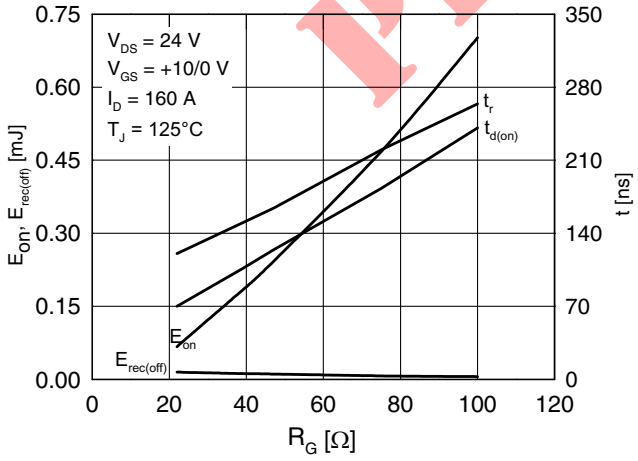

Fig. 11 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

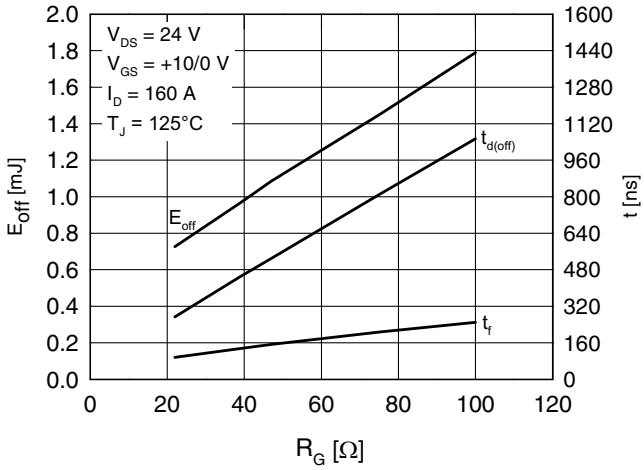

Fig. 12 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

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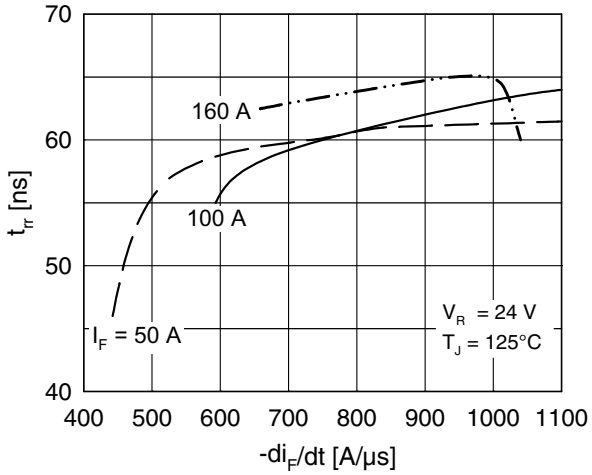

Fig. 13 Reverse recovery time t_{rr} of the body diode vs. di/dt

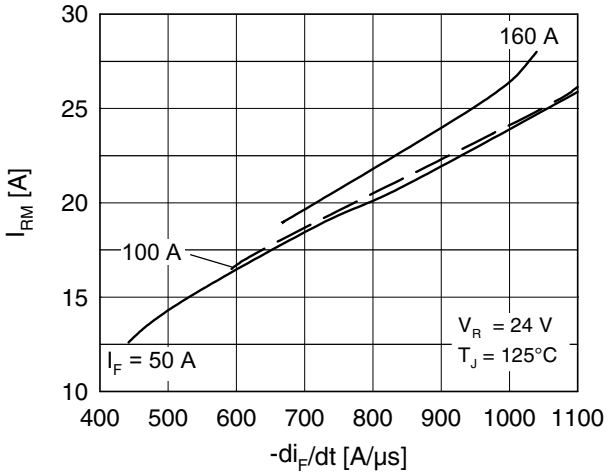

Fig. 14 Reverse recovery current I_{RM} of the body diode vs. di/dt

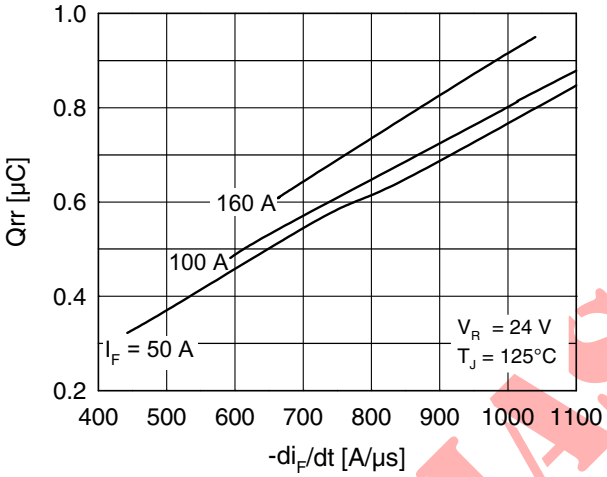

Fig. 15 Reverse recovery charge Q_{rr} of the body diode vs. di/dt

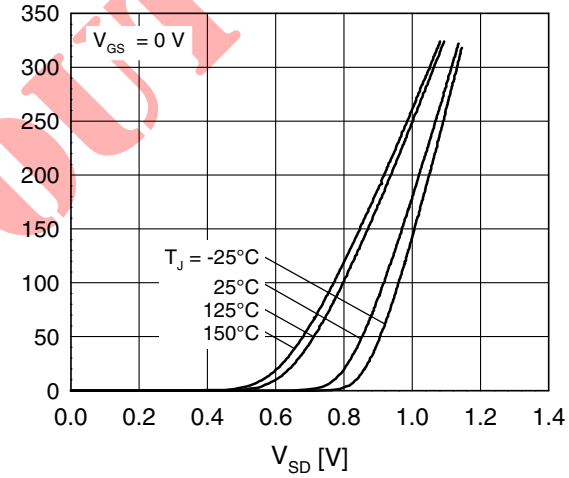

Fig. 16 Source drain diode current I_F vs. source drain voltage V_{SD} (body diode)

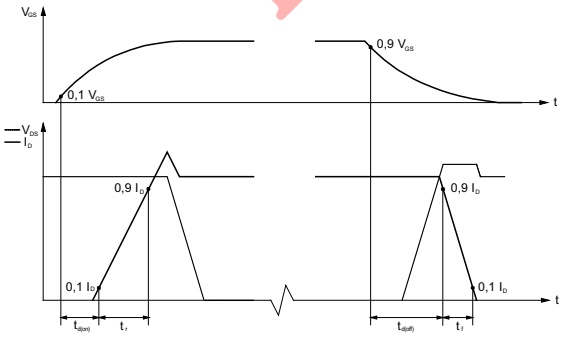

Fig. 17 Definition of switching times

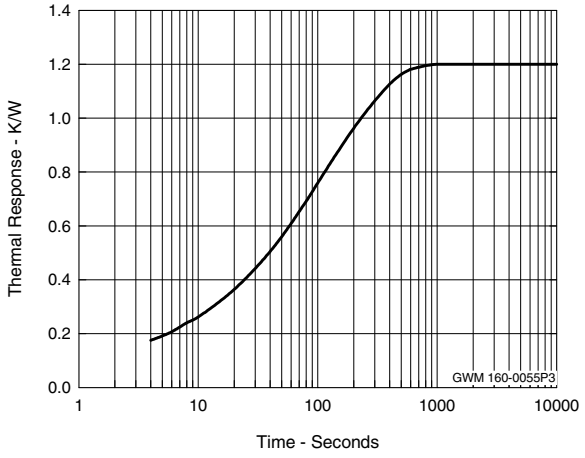

Fig. 18 Typ. thermal impedance junction to heatsink Z_{thJH} with heat transfer paste

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