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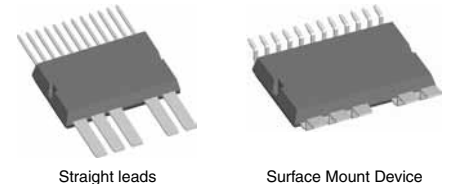
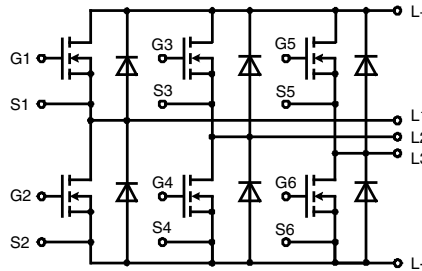
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[IXYS Corporation](#)  
[GWM160-0055X1-SL](#)

For any questions, you can email us directly:  
[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)

**Three phase full Bridge**  
 with Trench MOSFETs  
 in DCB isolated high current package

$V_{DSS} = 55\text{ V}$   
 $I_{D25} = 150\text{ A}$   
 $R_{DSon\ typ.} = 2.7\text{ m}\Omega$



MOSFETs		Maximum Ratings
Symbol	Conditions	
$V_{DSS}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	55 V
$V_{GS}$		$\pm 20\text{ V}$
$I_{D25}$	$T_C = 25^\circ\text{C}$	150 A
$I_{D90}$	$T_C = 90^\circ\text{C}$	115 A
$I_{F25}$	$T_C = 25^\circ\text{C (diode)}$	120 A
$I_{F90}$	$T_C = 90^\circ\text{C (diode)}$	75 A

**Applications**

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

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$(T_J = 25^\circ\text{C, unless otherwise specified})$					
$R_{DSon}^{1)}$	on chip level at $V_{GS} = 10\text{ V}; I_D = 100\text{ A}$		2.7	3.3	$\text{m}\Omega$
			4.5		$\text{m}\Omega$
$V_{GS(th)}$	$V_{DS} = 20\text{ V}; I_D = 1\text{ mA}$	2.5		4.5	V
$I_{DSS}$	$V_{DS} = V_{DSS}; V_{GS} = 0\text{ V}$		0.1	1	$\mu\text{A}$ mA
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}; V_{DS} = 0\text{ V}$			0.2	$\mu\text{A}$
$Q_g$	$V_{GS} = 10\text{ V}; V_{DS} = 12\text{ V}; I_D = 160\text{ A}$		105		nC
$Q_{gs}$			tbd		nC
$Q_{gd}$			tbd		nC
$t_{d(on)}$	inductive load $V_{GS} = 10\text{ V}; V_{DS} = 24\text{ V}$ $I_D = 100\text{ A}; R_G = 39\ \Omega;$ $T_J = 125^\circ\text{C}$		140		ns
$t_r$			125		ns
$t_{d(off)}$			550		ns
$t_f$			120		ns
$E_{on}$			0.17		mJ
$E_{off}$			0.60		mJ
$E_{recoff}$		0.004		mJ	
$R_{thJC}$	with heat transfer paste (IXYS test setup)			1.0	K/W
$R_{thJH}$			1.3	1.6	K/W

**Features**

- MOSFETs in trench technology:
  - low  $R_{DSon}$
  - 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**

- 2 lead forms available
  - straight leads (SL)
  - SMD lead version (SMD)

<sup>1)</sup>  $V_{DS} = I_D \cdot (R_{DS(on)} + 2R_{Pin\ to\ chip})$

**Recommended replacements: MTI 120W55GA / MTI 120W55GC**

**Source-Drain Diode**

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
(T <sub>J</sub> = 25°C, unless otherwise specified)					
V <sub>SD</sub>	(diode) I <sub>F</sub> = 100 A; V <sub>GS</sub> = 0 V		1.0	1.3	V
t <sub>rr</sub>	I <sub>F</sub> = 100 A; -di <sub>F</sub> /dt = 800 A/μs; V <sub>R</sub> = 24 V		40		ns
Q <sub>RM</sub>			0.42		μC
I <sub>RM</sub>			20		A

**Component**

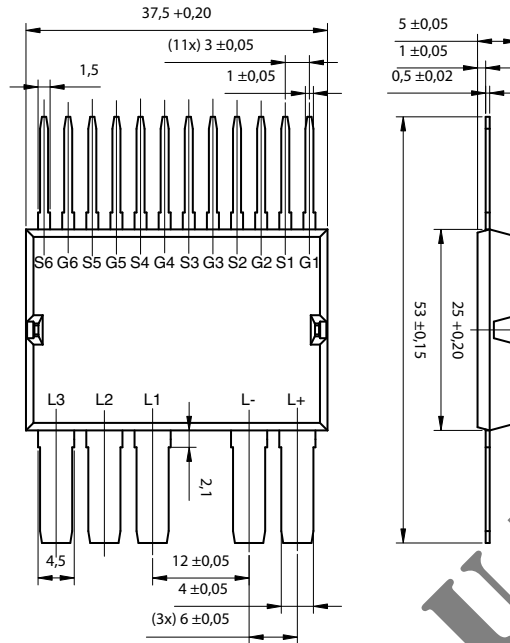
Symbol	Conditions	Maximum Ratings	
I <sub>RMS</sub>	per pin in main current paths (P+, N-, L1, L2, L3) may be additionally limited by external connections	300	A
T <sub>J</sub>		-55...+175	°C
T <sub>stg</sub>		-55...+125	°C
V <sub>ISOL</sub>	I <sub>ISOL</sub> ≤ 1 mA, 50/60 Hz, f = 1 minute	1000	V~
F <sub>C</sub>	mounting force with clip	50 - 250	N

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R <sub>pin to chip</sub> <sup>1)</sup>			0.6	mΩ
C <sub>P</sub>	coupling capacity between shorted pins and mounting tab in the case		160	pF
Weight			25	g

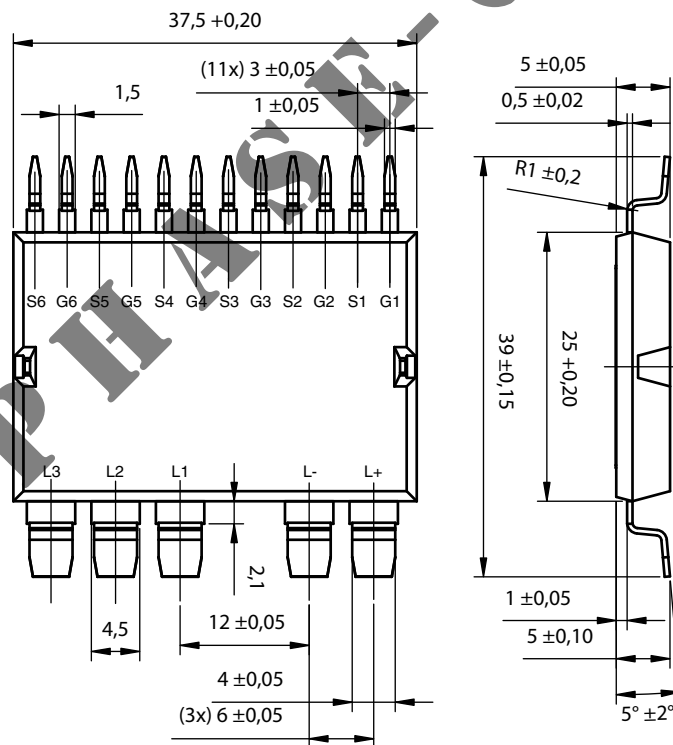
<sup>1)</sup> V<sub>DS</sub> = I<sub>D</sub> · (R<sub>DS(on)</sub> + 2R<sub>Pin to Chip</sub>)

PHASEROUT

**Straight Leads GWM 160-0055X1-SL**



**Surface Mount Device GWM 160-0055X1-SMD**



Leads	Ordering	Part Name & Packing Unit Marking	Part Marking	Delivering Mode	Base Qty.	Ordering Code
Straight	Standard	GWM 160-0055X1 - SL	GWM 160-0055X1	Blister	28	505 230
SMD	Standard	GWM 160-0055X1 - SMD	GWM 160-0055X1	Blister	28	504 862

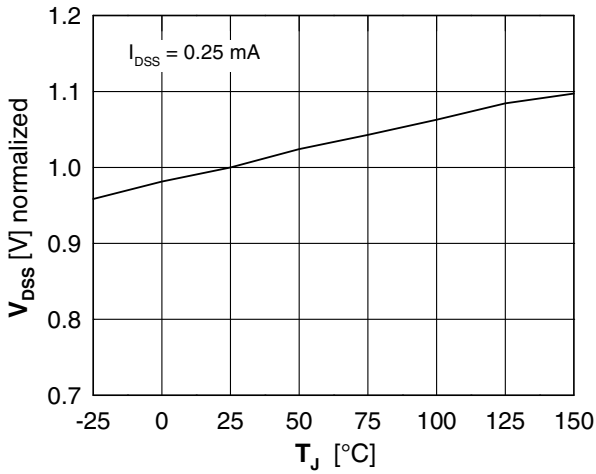


Fig. 1 Drain source breakdown voltage  $V_{DSS}$  vs. junction temperature  $T_J$

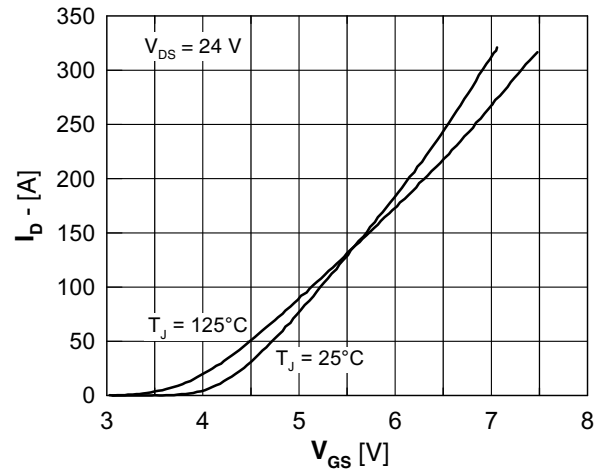


Fig. 2 Typical transfer characteristic

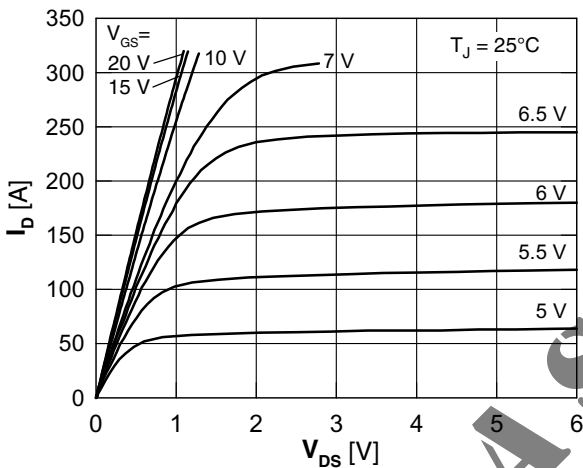


Fig. 3 Typical output characteristic

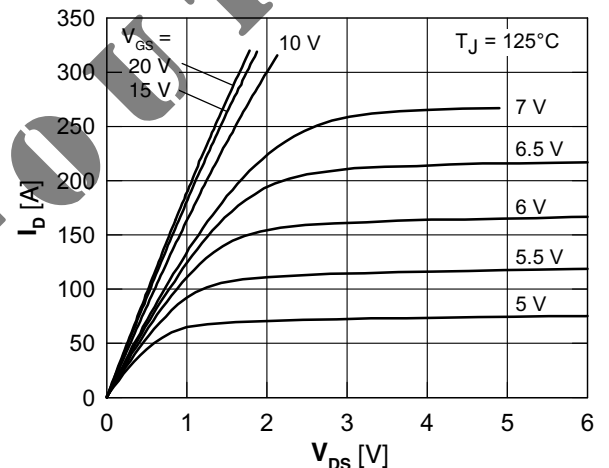


Fig. 4 Typical output characteristic

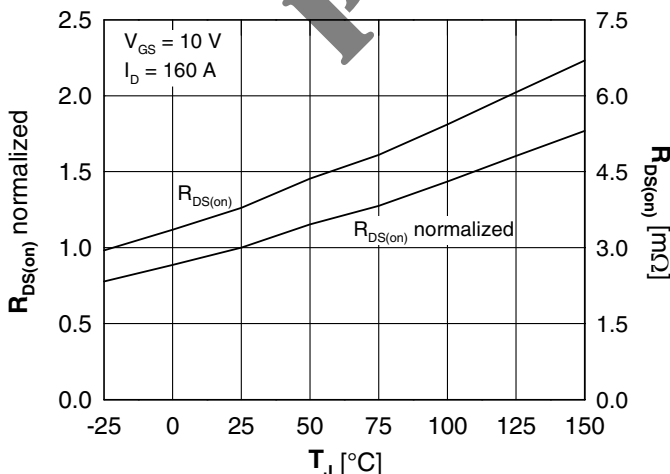


Fig. 5 Drain source on-state resistance  $R_{DS(on)}$  versus junction temperature  $T_J$

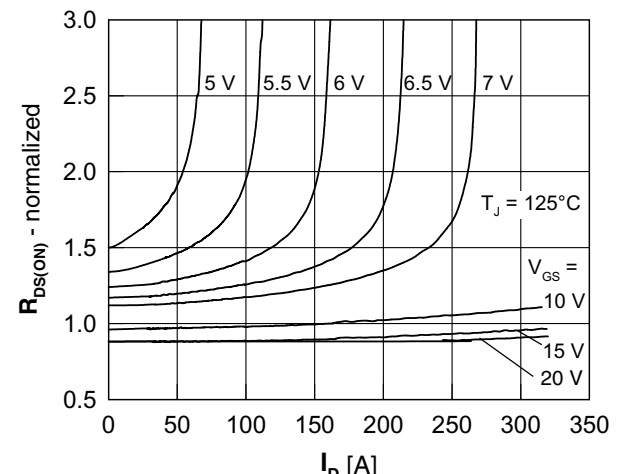


Fig. 6 Drain source on-state resistance  $R_{DS(on)}$  versus  $I_D$

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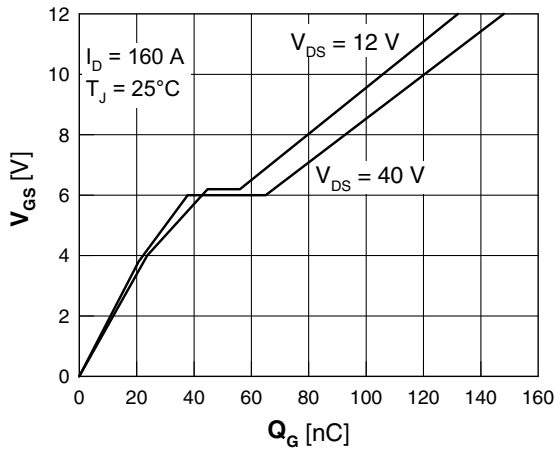


Fig.7 Gate charge characteristic

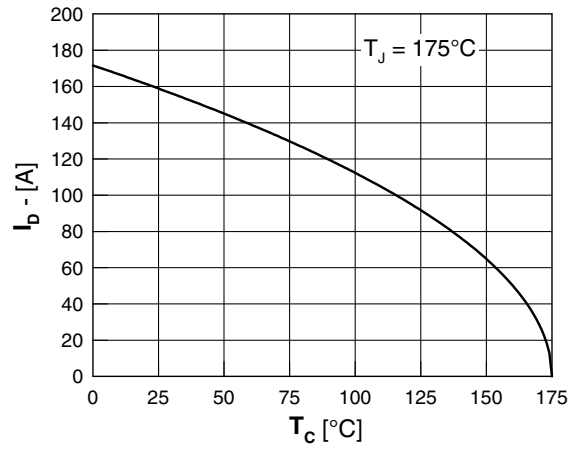


Fig. 8 Drain current  $I_D$  vs. case temperature  $T_c$

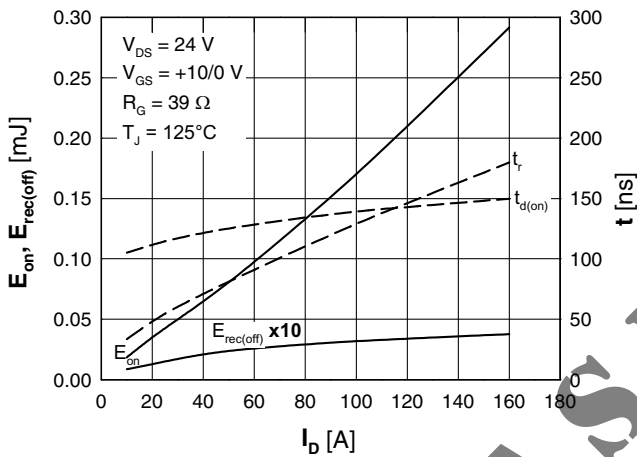


Fig. 9 Typ. turn-on energy & switching times vs. collector current, inductive switching

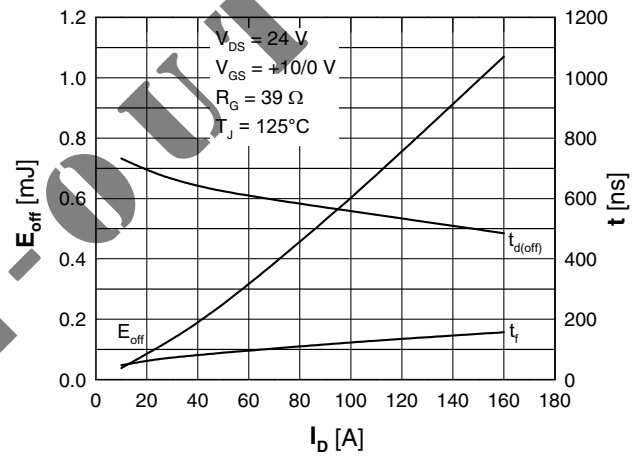


Fig. 10 Typ. turn-off energy & switching times vs. collector current, inductive switching

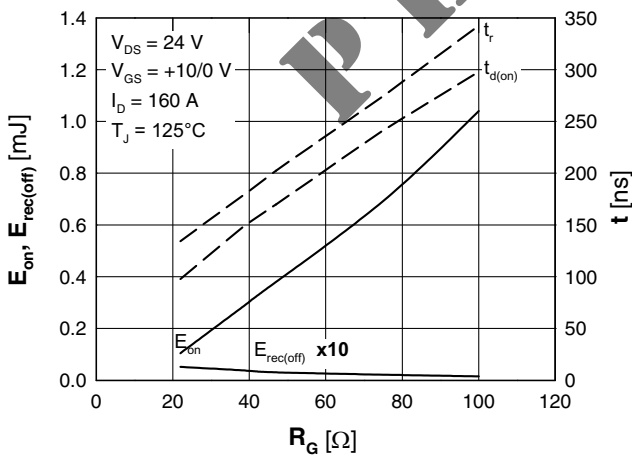


Fig. 11 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

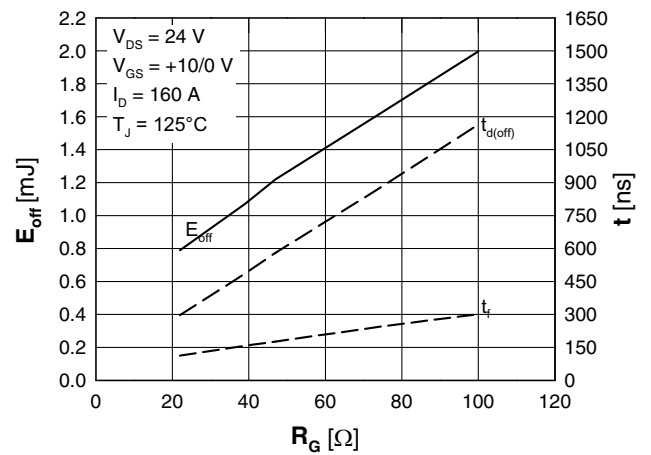


Fig. 12 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

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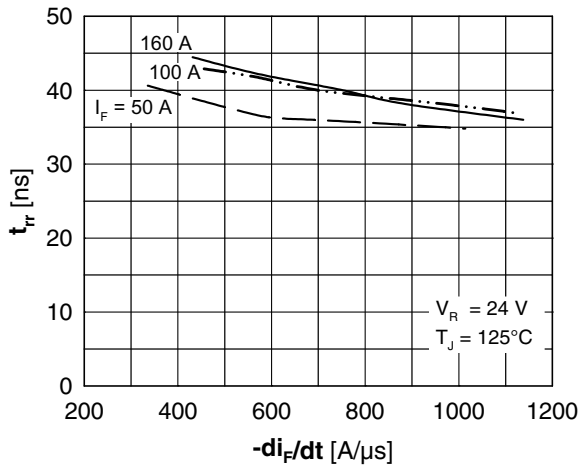


Fig. 13 Reverse recovery time  $t_{rr}$  of the body diode vs.  $di/dt$

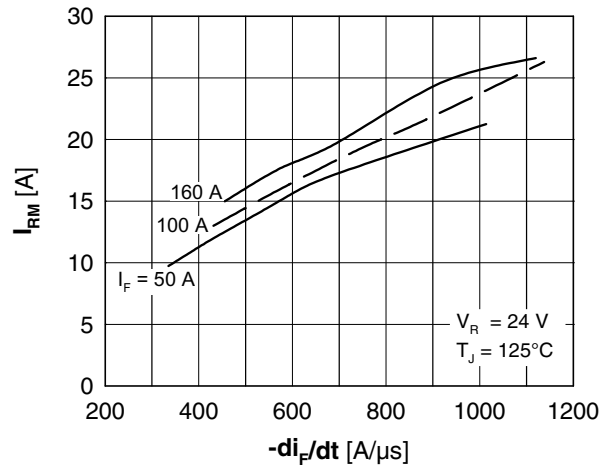


Fig. 14 Reverse recovery current  $I_{RM}$  of the body diode vs.  $di/dt$

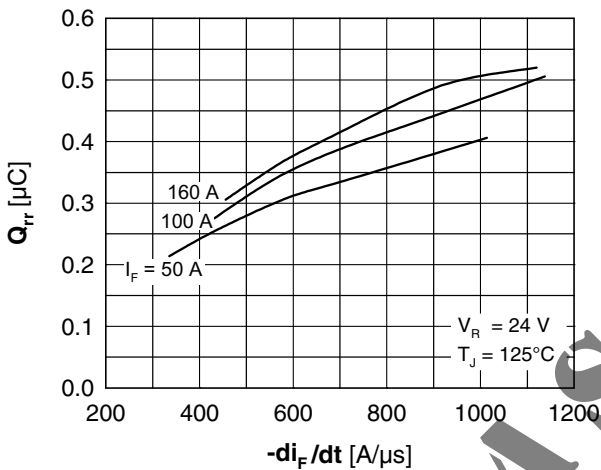


Fig. 15 Reverse recovery charge  $Q_{rr}$  of the body diode vs.  $di/dt$

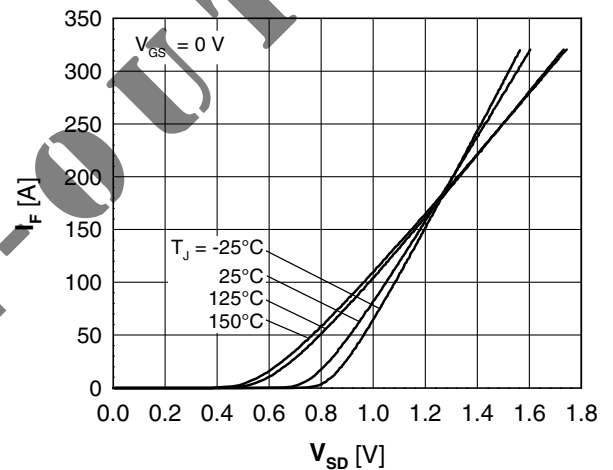


Fig. 16 Source drain diode current  $I_F$  vs. source drain voltage  $V_{SD}$  (body diode)

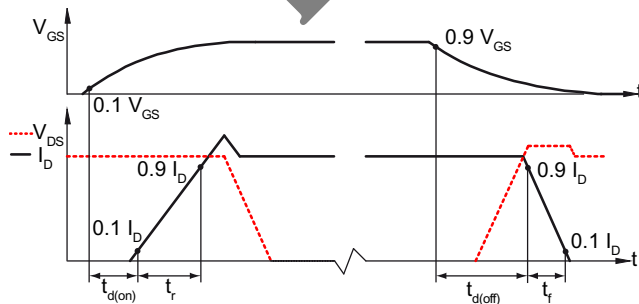


Fig. 17 Definition of switching times

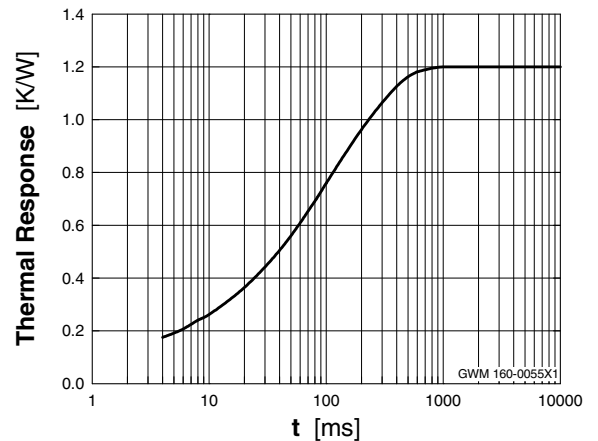


Fig. 18 Typ. thermal impedance junction to heatsink  $Z_{thJH}$  with heat transfer paste