

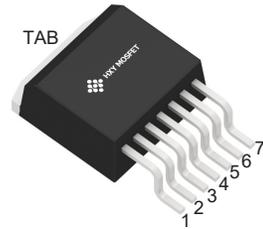


### Features

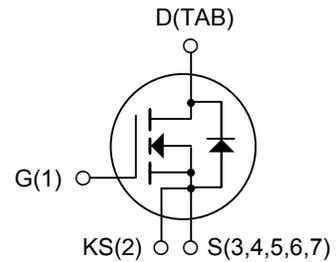
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low capacitances
- Avalanche Ruggednes

### Applications

- Solar Inverters
- Switch Mode Power Supplies
- Auxiliary power supplies
- Smart meters



TO-263-7L



Ordering Part Number	Package	Marking
G3R75MT12J	TO-263-7L	G3751KN



### Maximum Ratings (T<sub>c</sub> = 25 °C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source voltage	V <sub>DS</sub>	1200	V
Continuous drain current T <sub>c</sub> = 25°C T <sub>c</sub> = 100°C	I <sub>D</sub>	30 21	A
Source current(Body Diode) T <sub>c</sub> = 25°C T <sub>c</sub> = 100°C	I <sub>S</sub>	30 21	A
Pulsed drain current (T <sub>c</sub> = 25°C, t <sub>p</sub> limited by T <sub>Jmax</sub> )	I <sub>D pulse</sub>	80	A
Avalanche energy, single pulse (L=10mH)	E <sub>AS</sub>	600	mJ
Gate-Source voltage	V <sub>GS</sub>	-4/+18	V
Gate-Source voltage (dynamic,Absolute maximum values)	V <sub>GSmax</sub>	-8/+22	V
Power dissipation (T <sub>c</sub> = 25°C)	P <sub>tot</sub>	136	W
Operating junction and storage temperature	T <sub>J</sub> , T <sub>stg</sub>	-55...+175	°C

- Example of acceptable V<sub>GS</sub> waveform





### Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	$R_{thJC}$	1.1	°C/W
Thermal resistance, junction – ambient. Max	$R_{thJA}$	40	

### Electrical Characteristic (at $T_j = 25^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition	
		min.	typ.	max.			
<b>Static Characteristics</b>							
Drain-source breakdown voltage	$V_{DSS}$	1200	-	-	V	$V_{GS}=0V, I_D=100\mu A$	
Gate threshold voltage	$V_{GS(th)}$	2.3	2.8	3.6	V	$V_{DS}=V_{GS}, I_D=5mA$	
Zero gate voltage drain current	$I_{DSS}$	-	1	10	$\mu A$	$V_{DS}=1200V, V_{GS}=0V$	
		-	5	-		$T_C=25^\circ C$	
		-	-	-		$T_C=175^\circ C$	
Gate-source leakage current	$I_{GSS}$	-	-	100	nA	$V_{GS}=18V, V_{DS}=0V$	
Drain-source on-state resistance	$R_{DS(on)}$	-	75	85	m $\Omega$	$V_{GS}=18V, I_D=20A,$	
		-	125	-		$T_J=25^\circ C$	
		-	-	-		$T_J=175^\circ C$	
Transconductance	$g_{fs}$	-	10	-	S	$V_{DS}=20V, I_D=20A$	
<b>Dynamic Characteristics</b>							
Input Capacitance	$C_{iss}$	-	920	-	pF	$V_{DS} = 1000V$ $V_{GS} = 0V$ $T_J = 25^\circ C$ $V_{AC} = 25mV$ $f = 1MHz$	
Output Capacitance	$C_{oss}$	-	57	-			
Reverse Transfer Capacitance	$C_{rss}$	-	3.9	-			
Gate Total Charge	$Q_G$	-	40	-	nC	$V_{DS} = 800V$ $V_{GS} = -4/+18V$ $I_D = 20A$	
Gate-Source charge	$Q_{gs}$	-	7	-			
Gate-Drain charge	$Q_{gd}$	-	19	-			
Turn-On Switching Energy	$E_{ON}$	-	320	-	$\mu J$	$V_{DD} = 800V$ $V_{GS} = -4/+15V$ $I_D = 20A$ $R_G = 0\Omega$ $L = 120\mu H$	
Turn-Off Switching Energy	$E_{OFF}$	-	49	-			
Turn-on delay time	$t_{d(on)}$	-	19	-	ns		
Rise time	$t_r$	-	21	-			
Turn-off delay time	$t_{d(off)}$	-	15	-			
Fall time	$t_f$	-	17	-			
Gate resistance	$R_G$	-	1.5	-	$\Omega$		$V_{AC} = 25mV, f=1MHz$



**Body Diode Characteristics**

Parameter	Symbol	Value			Unit	Test Condition		
		min.	typ.	max.				
Body Diode Forward Voltage	$V_{SD}$	-	4.2	-	V	$V_{GS}=-4V, I_{SD}=10A,$ $T_J=25^{\circ}C$		
		-	3.8	-		$V_{GS}=-4V, I_{SD}=10A,$ $T_J=175^{\circ}C$		
Body Diode Forward Current	$I_{SD}$	-	-	30	A	$V_{GS}=-4V, T_J=25^{\circ}C$		
Pulsed Body Diode Forward Current	$I_{SDM}$	-	-	89				
Reverse Recovery Time	$t_{rr}$	-	39.6	-	ns	$V_R = 800V,$ $V_{GS} = -4V$ $I_D = 20A$ $di/dt = 700A/\mu S$ $T_J = 25^{\circ}C$		
Reverse Recovery Charge	$Q_{rr}$	-	141.1	-			nC	
Reverse Recovery Energy	$E_{REC}$	-	62.9	-			uJ	
Peak Reverse Recovery Current	$I_{rrm}$	-	6.2	-			A	
Charge Time	$t_A$	-	9.9	-			ns	
DisCharge Time	$t_B$	-	29.7	-			ns	
Reverse Recovery Time	$t_{rr}$	-	45.4	-			ns	$V_R = 800V,$ $V_{GS} = -4V$ $I_D = 20A$ $di/dt = 700A/\mu S$ $T_J = 175^{\circ}C$
Reverse Recovery Charge	$Q_{rr}$	-	397	-				
Reverse Recovery Energy	$E_{REC}$	-	180.1	-	uJ			
Peak Reverse Recovery Current	$I_{rrm}$	-	13.8	-	A			
Charge Time	$t_A$	-	30.8	-	ns			
DisCharge Time	$t_B$	-	14.9	-	ns			



### Typical Performance Characteristics

Fig 1. Output Characteristic ( $T_J = -40^\circ\text{C}$ )

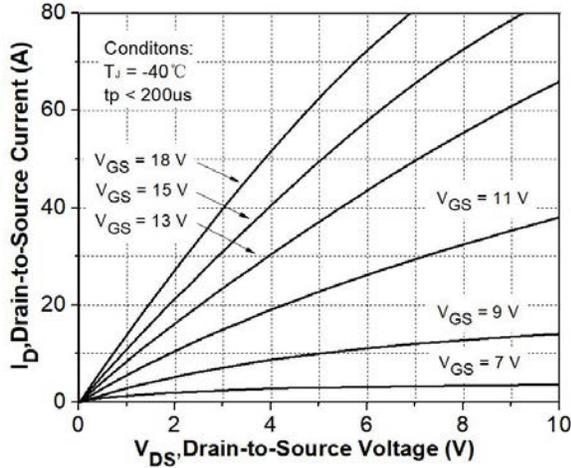


Fig 2. Output Characteristic ( $T_J = 25^\circ\text{C}$ )

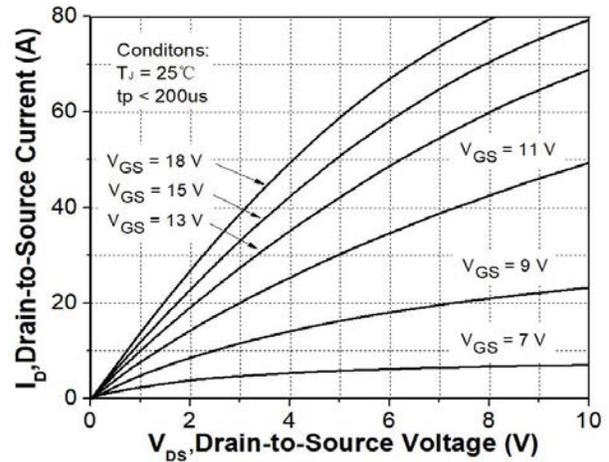


Fig 3. Output Characteristic ( $T_J = 175^\circ\text{C}$ )

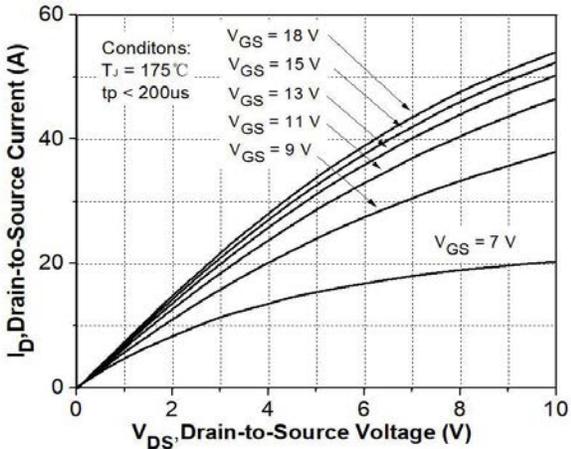


Fig 4: Rds(on) Vs Ids Characteristic

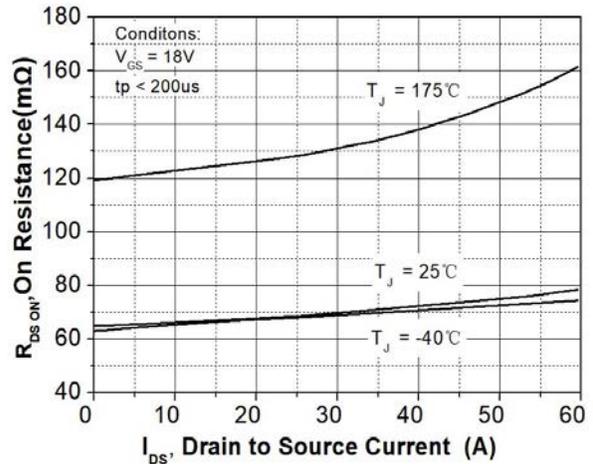


Fig 5: Rds(on) vs. Temperature

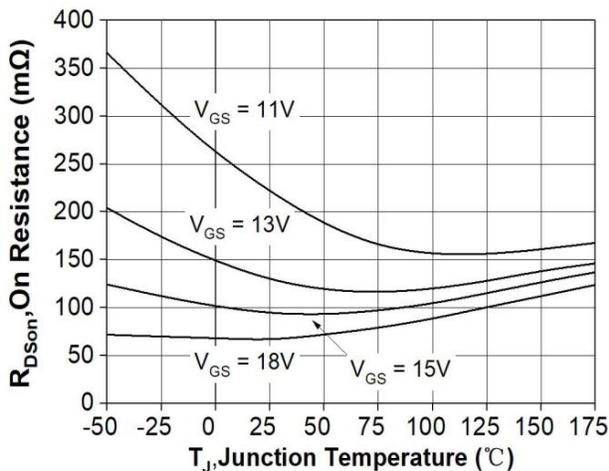


Fig 6: Transfer Characteristic

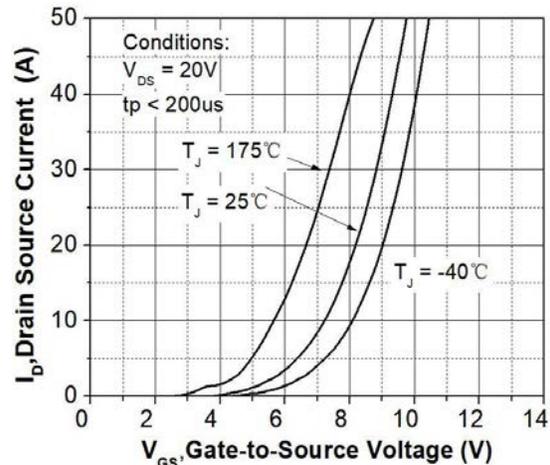




Fig 7: Body-diode Characteristic ( $T_J = -40^\circ\text{C}$ )

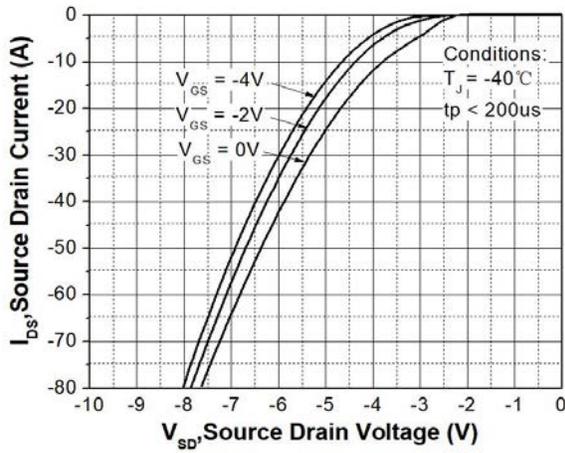


Fig 8: Body-diode Characteristic ( $T_J = 25^\circ\text{C}$ )

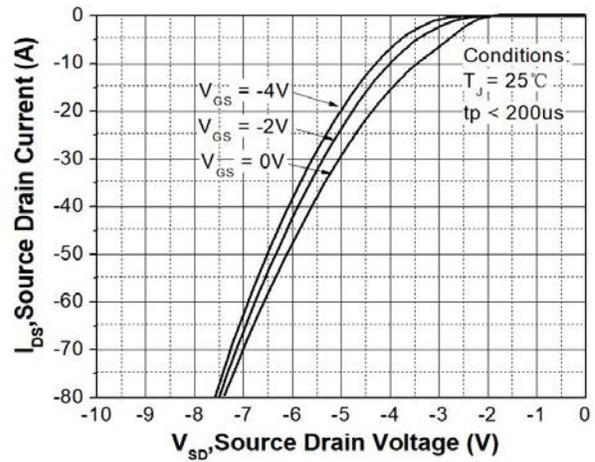


Fig 9: Body-diode Characteristic ( $T_J = 175^\circ\text{C}$ )

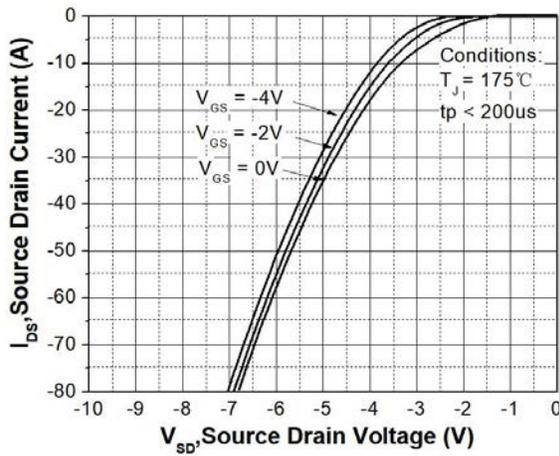


Fig 10:  $V_{TH}$  Vs  $T_J$  Temperature Characteristic

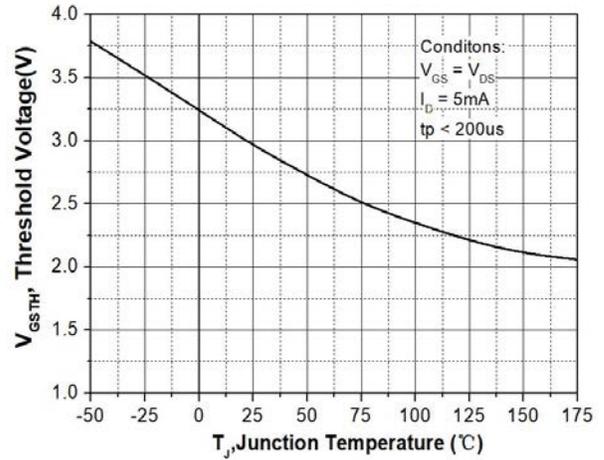


Fig 11: Gate Charge Characteristics

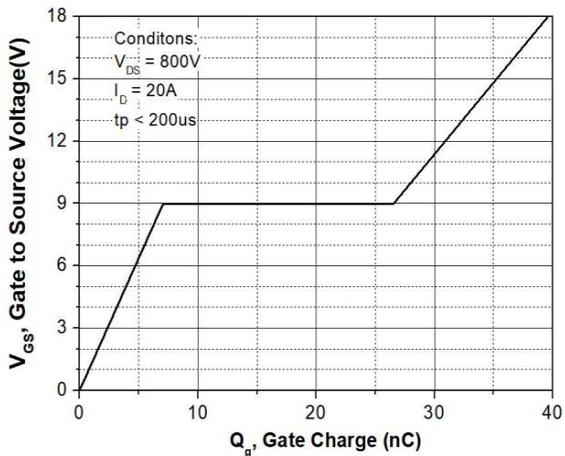


Fig 12: 3rd Quadrant Characteristic ( $T_J = -40^\circ\text{C}$ )

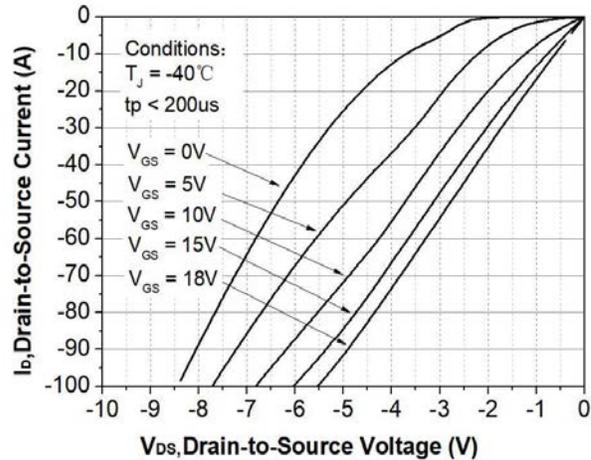




Fig 13: 3rd Quadrant Characteristic( $T_J=25^\circ\text{C}$ )

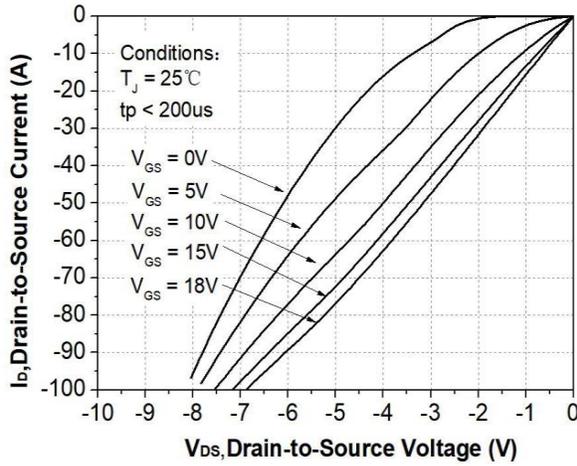


Fig 14: 3rd Quadrant Characteristic( $T_J=175^\circ\text{C}$ )

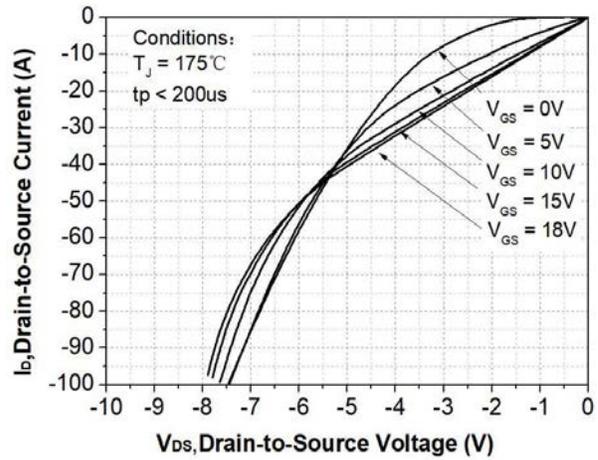


Fig 15: Capacitance Characteristic

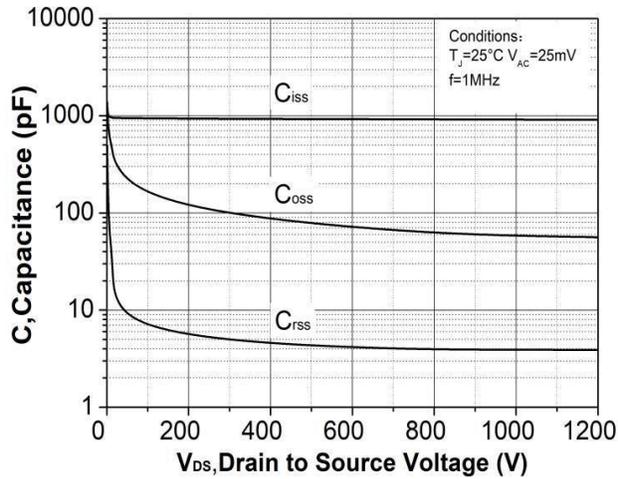


Fig 16: Safe Operating Area

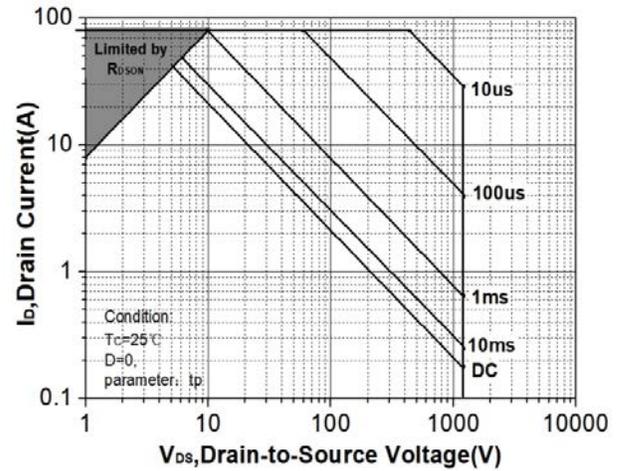
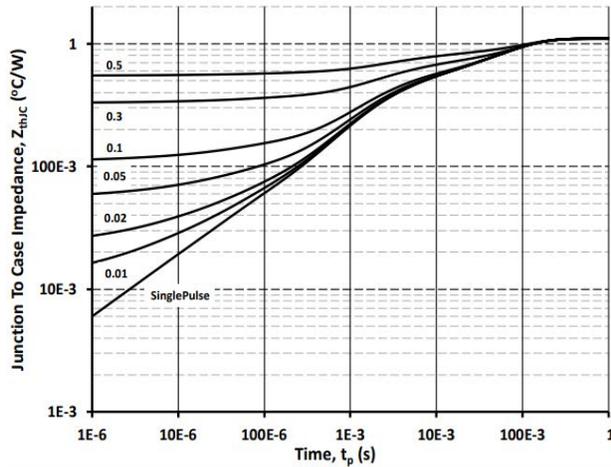


Fig 17: Transient Thermal Impedance





## Test Circuit Schematic

Figure A. Definition of switching times

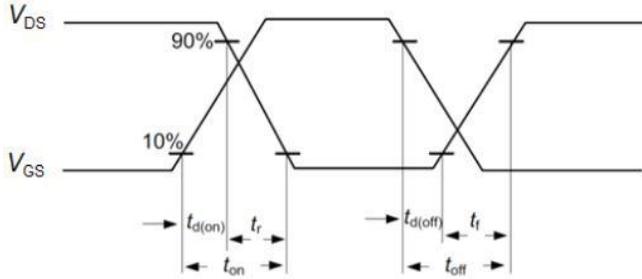


Figure B. Dynamic test circuit

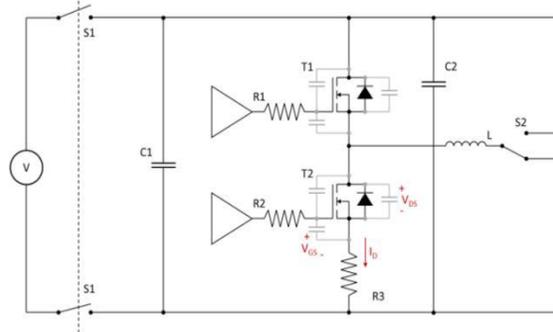


Figure C. Definition of body diodeswitching characteristics

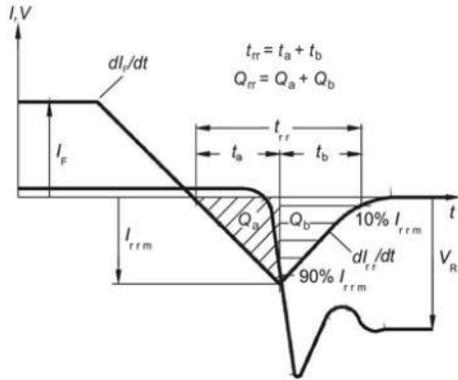
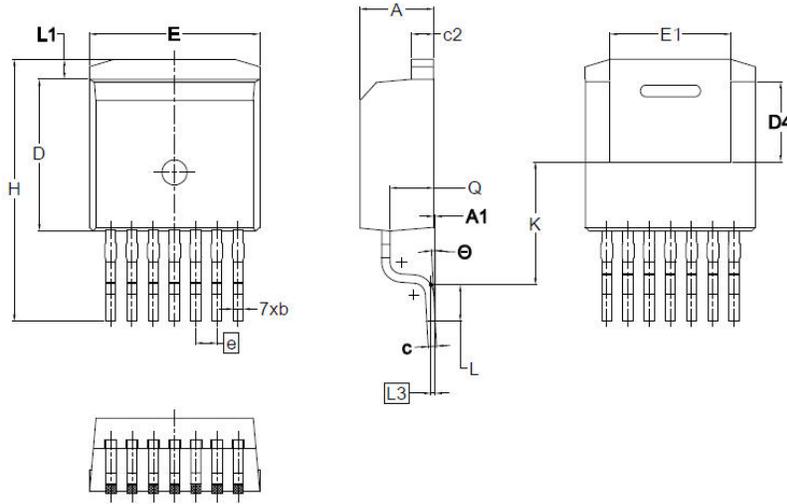


Figure C. Definition of diode switching characteristics



## Package Dimensions

Package TO-263-7L



SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	4.30	4.40	4.50
A1	0.00	0.10	0.25
b	0.50	0.60	0.70
c	0.45	0.50	0.60
c2	1.20	1.30	1.40
D	8.93	9.08	9.23
D4	4.65	4.80	4.95
E	10.08	10.18	10.28
E1	6.82	7.22	7.62
e	1.27 BSC		
H	15.00	15.70	16.00
K	7.30		
L	1.90	2.20	2.50
L1	1.00	1.20	1.40
L3	0.25 BSC		
Q	2.45	2.60	2.75
theta	0°	3°	7°



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