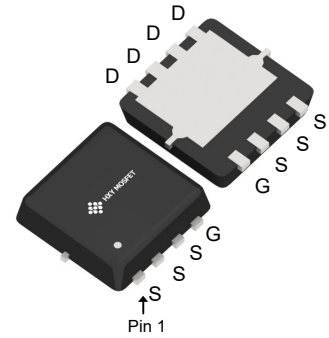


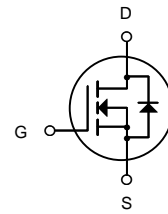


Description

The TSM052NB03CR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



DFN3X3-8L



N-Channel MOSFET

General Features

$V_{DS} = 30V$ $I_D = 100A$

$R_{DS(ON)} < 3m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
TSM052NB03CR	DFN3X3-8L	HXY MOSFET	5000

Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
$I_D@T_c=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V	100	A
$I_D@T_c=100^\circ C$	Continuous Drain Current, V_{GS} @ 10V	60	A
IDM	Pulsed Drain Current	320	A
EAS	Single Pulse Avalanche Energy	156	mJ
P _D	Total Power Dissipation	31.7	W
TSTG	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJC}	Thermal Resistance Junction-Case	3.94	°C/W



Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=30V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.6	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance ³	$V_{GS}=10V, I_D=30A$	---	2.5	3	m Ω
		$V_{GS}=4.5V, I_D=20A$	---	4.3	5.5	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V,$ $f=1MHz$	---	3499	---	pF
C_{oss}	Output Capacitance		---	499	--	
C_{riss}	Reverse Transfer Capacitance		---	430	---	
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=15V, I_D=30A,$ $R_G=3\Omega, V_{GS}=10V$	---	12	---	ns
t_r	Rise Time		---	119	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	59	---	ns
t_f	Fall Time		---	109	---	ns
Q_g	Total Gate Charge	$V_{GS}=10V, V_{DS}=15V,$ $I_D=30A$	---	69	---	nC
Q_{gs}	Gate-Source Charge		---	10	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	17	---	nC
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=30A$	---	---	1.2	V
I_S	Continuous Drain Current	$V_D=V_G=0V$	---	---	100	A
I_{SM}	Pulsed Drain Current		---	---	320	A
T_{rr}	Reverse Recovery Time	$I_F=20A, T_J=25^\circ\text{C}$	---	21	---	NS
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$	---	9	---	NC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=10V, R_G=25\Omega, L=0.5mH, I_{AS}=25A$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Performance Characteristics

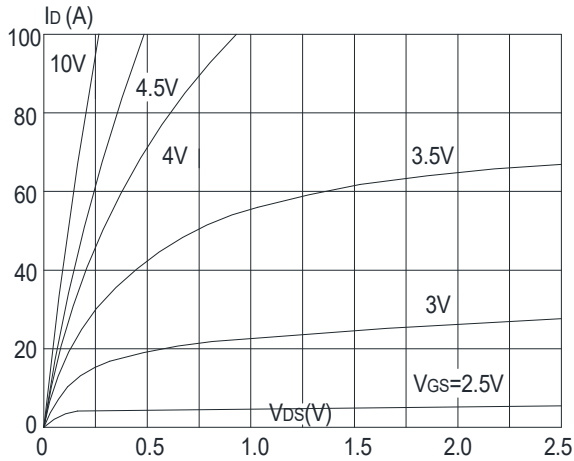


Figure 1: Output Characteristics

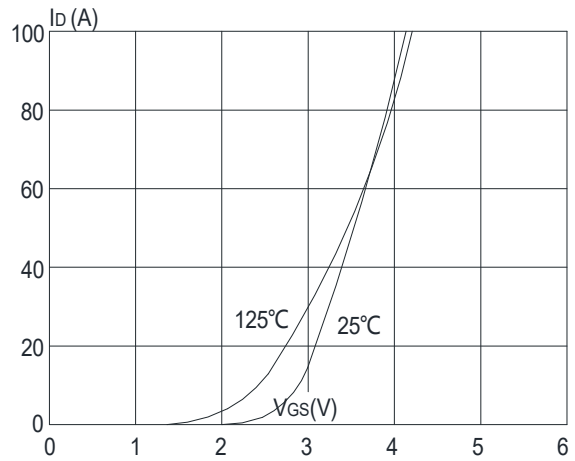


Figure 2: Typical Transfer Characteristics

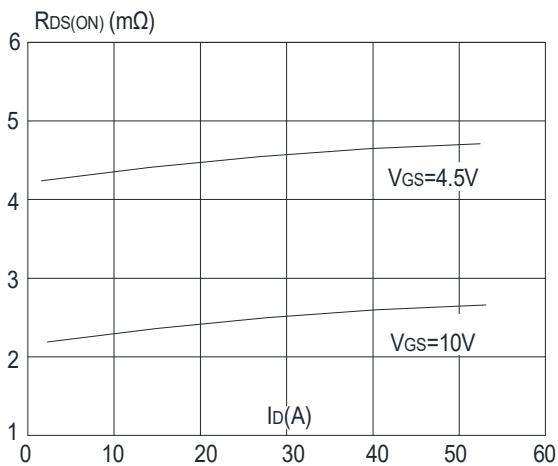


Figure 3: On-resistance vs. Drain Current

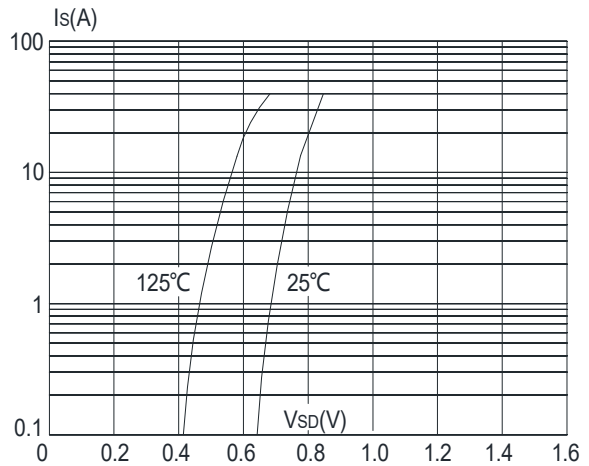


Figure 4: Body Diode Characteristics

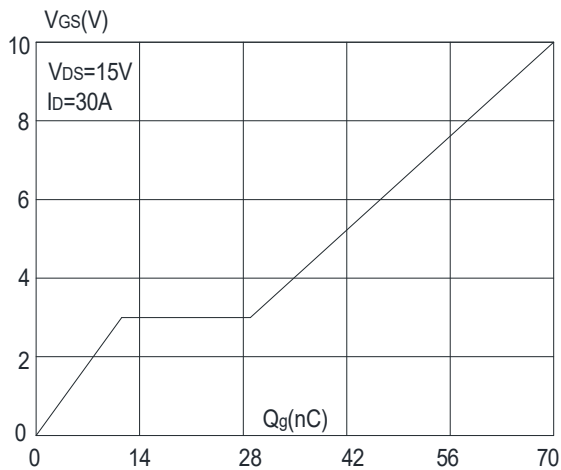


Figure 5: Gate Charge Characteristics

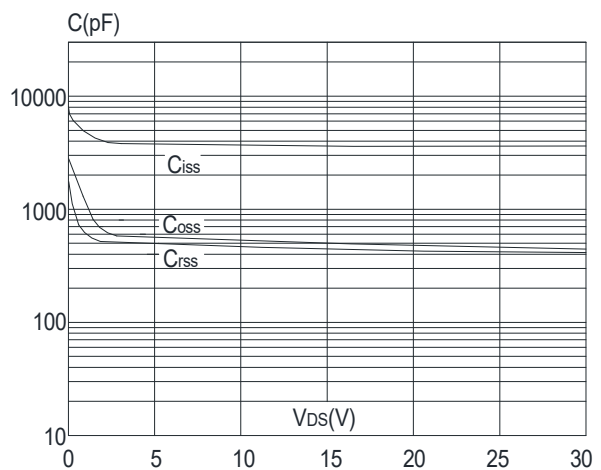


Figure 6: Capacitance Characteristics

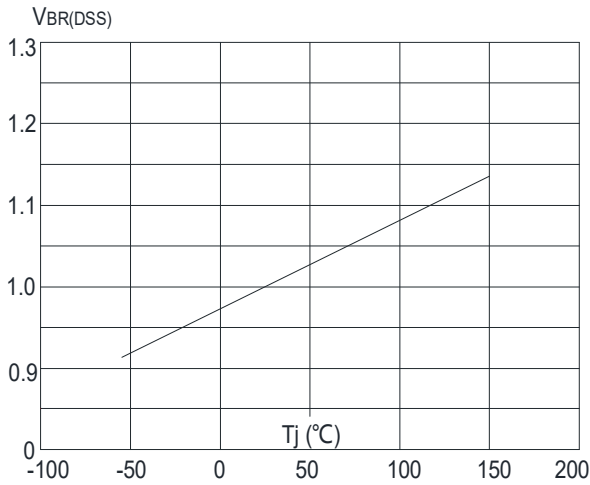


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

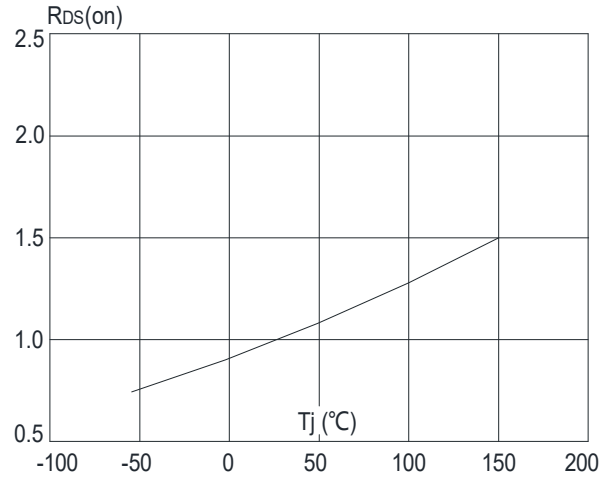


Figure 8: Normalized on Resistance vs. Junction Temperature

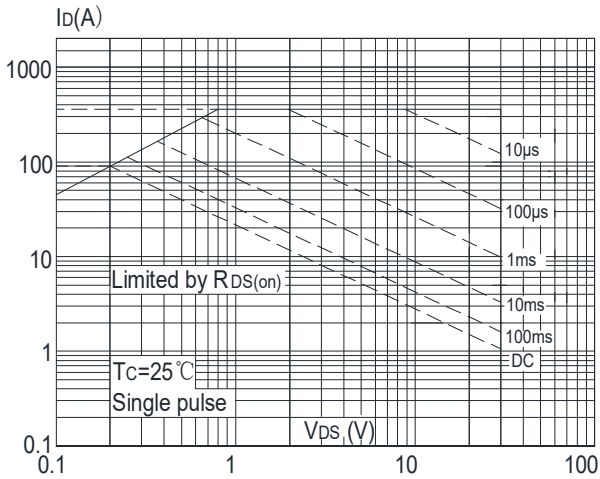


Figure 9: Maximum Safe Operating Area

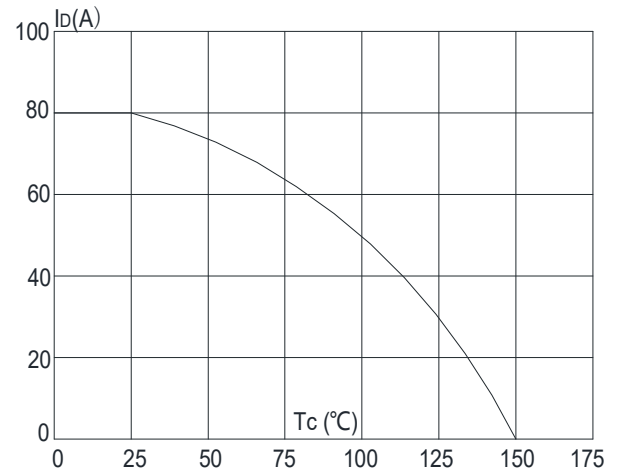


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

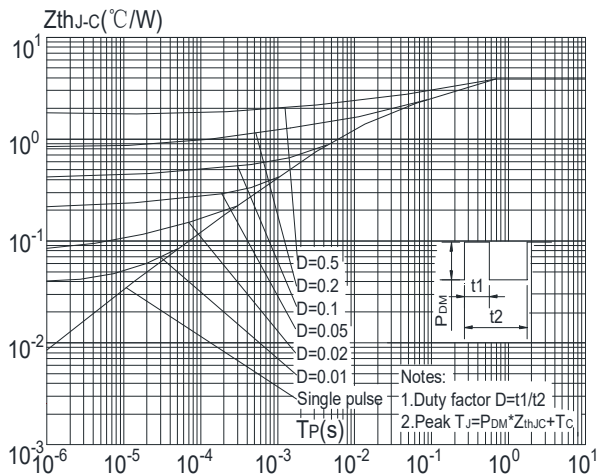
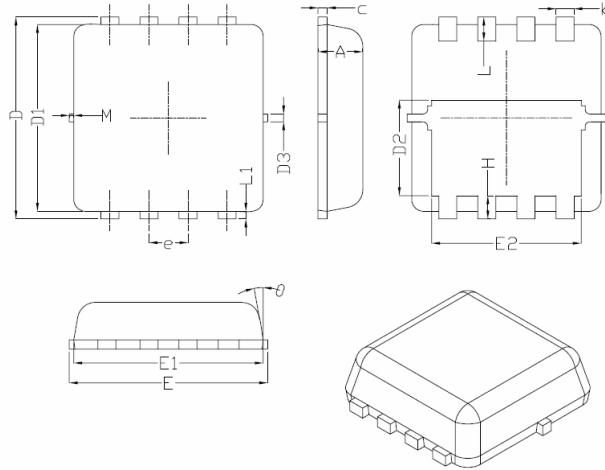


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°



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