



30V N+P Dual Channel MOSFETs

General Description

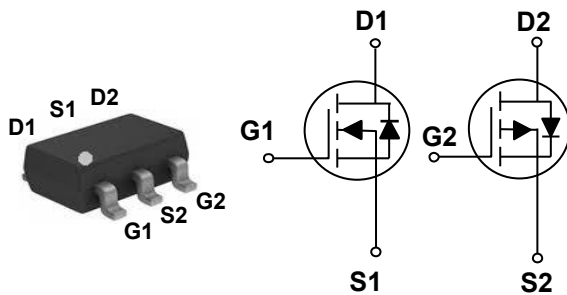
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications

BV _{DSS}	R _{DS(ON)}	I _D
30 V	30 mΩ	4 A
-30 V	65 mΩ	-3 A

Features

- Fast switching
- Green Device Available
- Suit for 4.5V Gate Drive Applications

SOT-23-6 Pin Configuration



Applications

- DC Fan
- Motor Drive Applications
- Networking
- Half / Full Bridge Topology

Absolute Maximum Ratings T_c=25°C unless otherwise noted

Symbol	Parameter	Rating		Units
V _{DS}	Drain-Source Voltage	30	-30	V
V _{GS}	Gate-Source Voltage	±20	±20	V
I _D	Drain Current - Continuous (T _A =25°C)	4	-3	A
	Drain Current - Continuous (T _A =100°C)	2.5	-1.8	A
I _{DM}	Drain Current - Pulsed (NOTE 1)	16	-12	A
P _D	Power Dissipation (T _A =25°C)	2		W
T _J	Operating Junction Temperature Range	-55 to 150		°C
T _{STG}	Storage Temperature Range	-55 to 150		°C
Marking Code		k		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to Ambient	---	62.5	°C/W



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N Channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=4A$	---	---	30	m Ω
		$V_{GS}=4.5V, I_D=2A$	---	---	37	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.6	2.5	V
gfs	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	6.5	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=4.5V, I_D=3A$ (NOTE 2、3)	---	4.1	---	nC
Q_{gs}	Gate-Source Charge		---	1.0	---	
Q_{gd}	Gate-Drain Charge		---	2.1	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega,$ $I_D=1A$ (NOTE 2、3)	---	2.8	---	nS
T_r	Rise Time		---	7.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	15.8	---	
T_f	Fall Time		---	4.6	---	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	345	---	pF
C_{oss}	Output Capacitance		---	55	---	
C_{rss}	Reverse Transfer Capacitance		---	32	---	
R_g	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	3.2	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	4	A
I_{SM}	Pulsed Source Current		---	---	8	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1	V



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Characteristics Curves

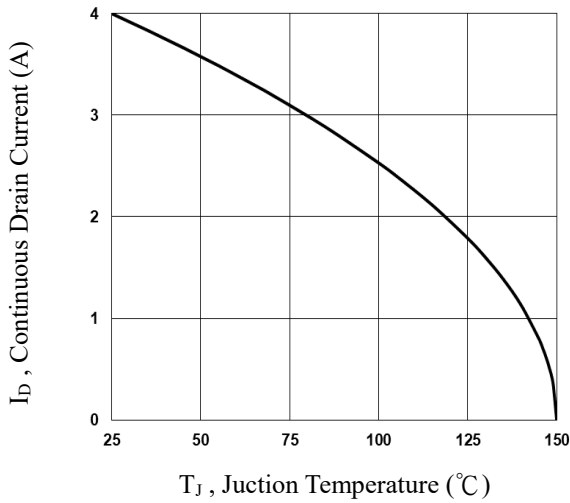


Fig.1 Continuous Drain Current vs. T_c

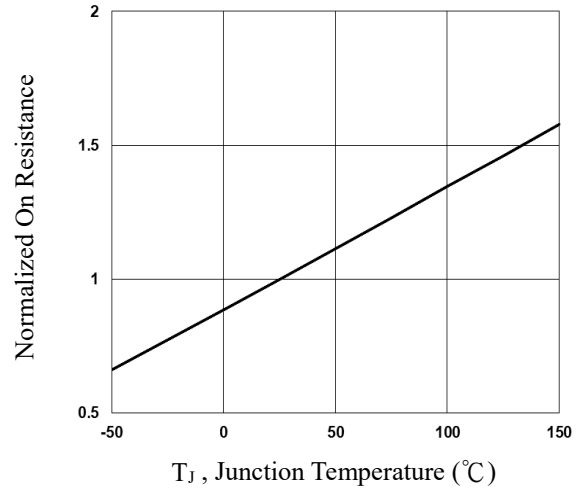


Fig.2 Normalized RDSON vs. T_J

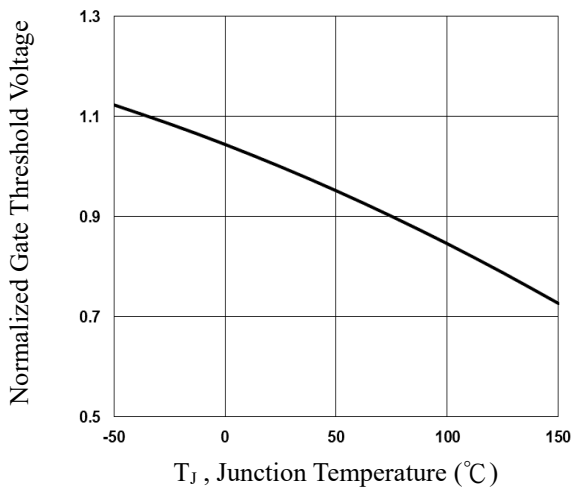


Fig.3 Normalized V_{th} vs. T_J

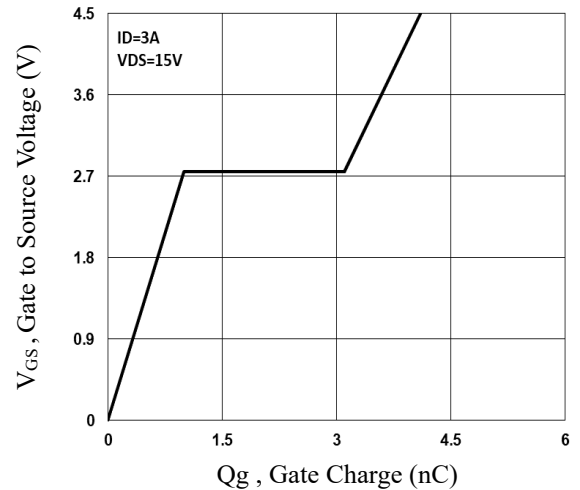


Fig.4 Gate Charge Waveform

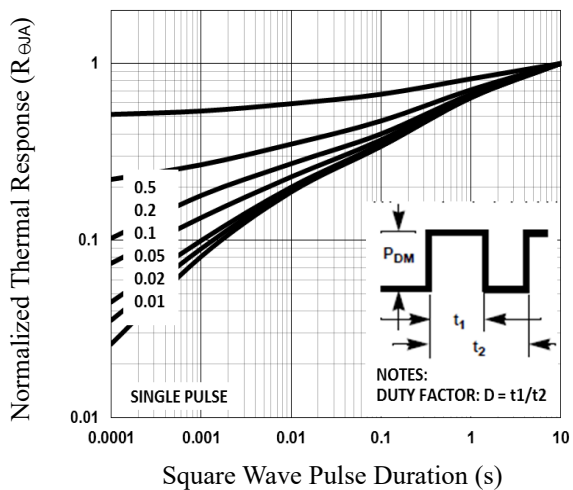


Fig.5 Normalized Transient Response

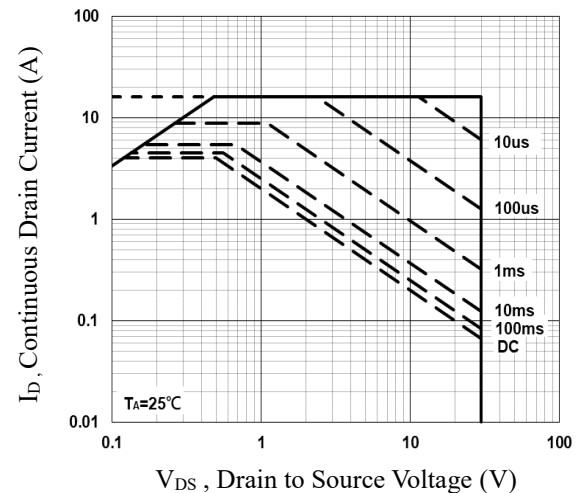


Fig.6 Maximum Safe Operation Area



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P Channel Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu\text{A}$	-30	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-3A$	---	---	65	m Ω
		$V_{GS}=-4.5V, I_D=-2A$	---	---	90	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu\text{A}$	-1.2	-1.6	-2.2	V
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-3A$	---	3.7	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=-30V, V_{GS}=-4.5V, I_D=-2A$ (NOTE 2、3)	---	5	---	nC
Q_{gs}	Gate-Source Charge		---	1.4	---	
Q_{gd}	Gate-Drain Charge		---	1.7	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-30V, V_{GS}=-10V, R_G=6\Omega, I_D=-1A$ (NOTE 2、3)	---	3.4	---	nS
T_r	Rise Time		---	10.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	26.9	---	
T_f	Fall Time		---	6.9	---	
C_{iss}	Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, F=1\text{MHz}$	---	420	---	pF
C_{oss}	Output Capacitance		---	50	---	
C_{riss}	Reverse Transfer Capacitance		---	35	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-3	A
I_{SM}	Pulsed Source Current		---	---	-6	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.



Characteristics Curves

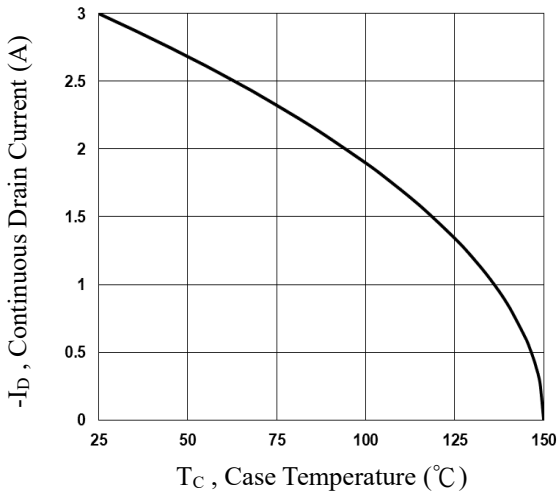


Fig.7 Continuous Drain Current vs. Tc

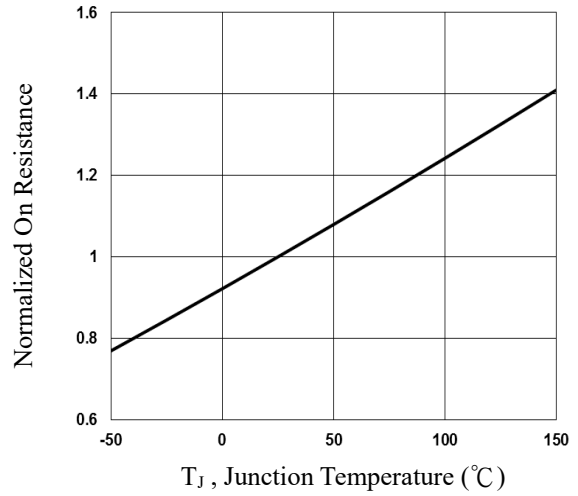


Fig.8 Normalized RDS(on) vs. Tj

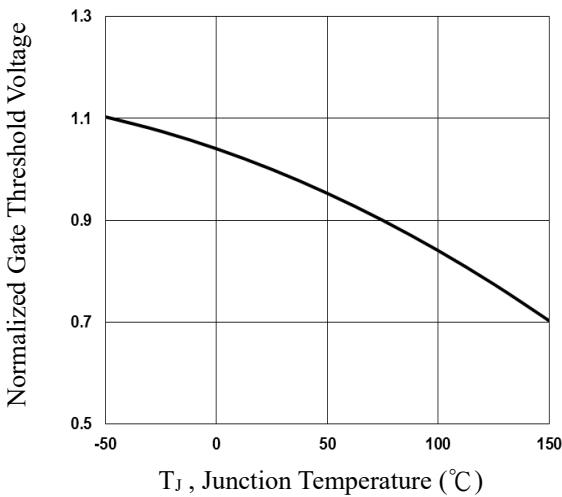


Fig.9 Normalized Vth vs. Tj

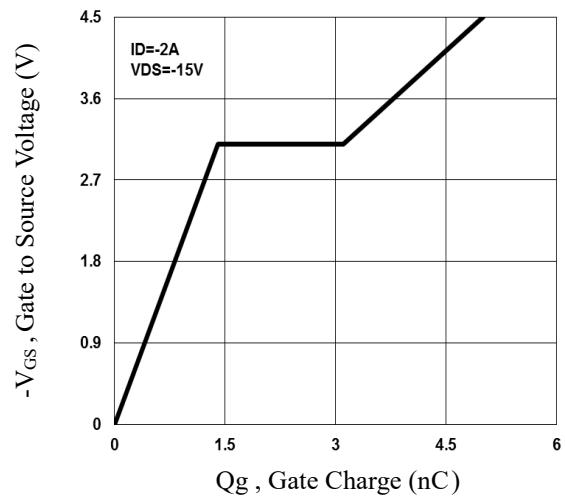


Fig.10 Gate Charge Waveform

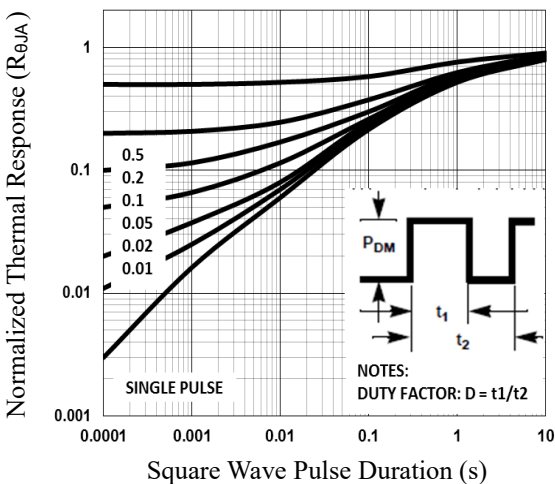


Fig.11 Normalized Transient Impedance

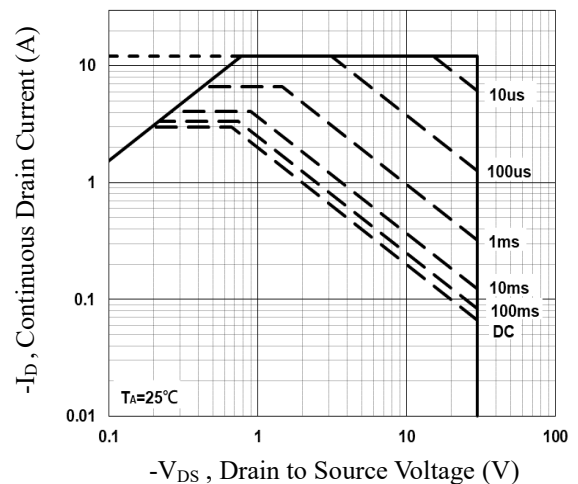


Fig.12 Maximum Safe Operation Area

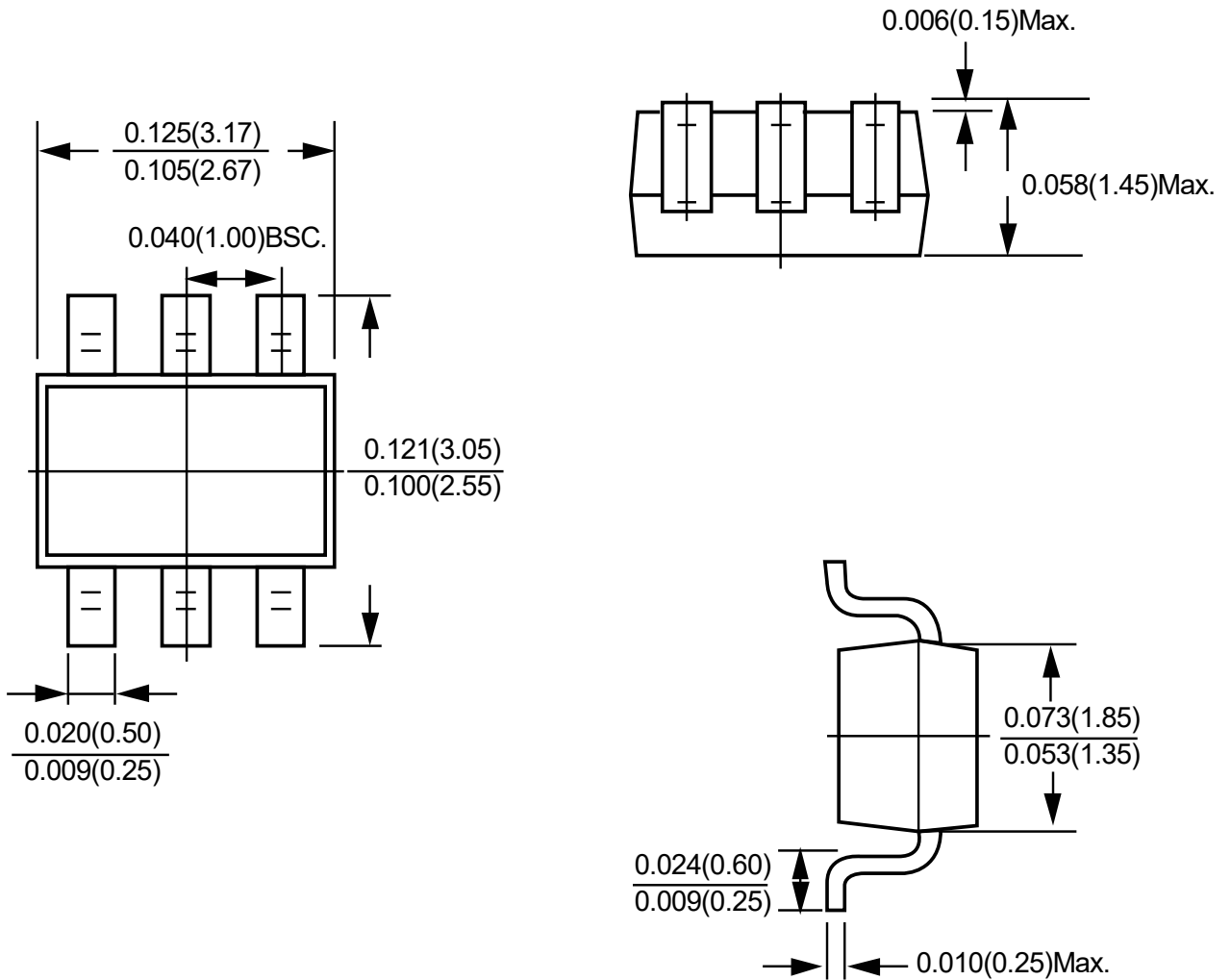


TMMBC030



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Package Outline Dimensions



SOT-23-6

Dimensions in inches and (millimeters)



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