N-Channel Power MOSFET

FEATURES

- Latest super-junction technology
- Low gate charge capacitance
- High gate noise immunity
- RoHS compliant
- Halogen-free

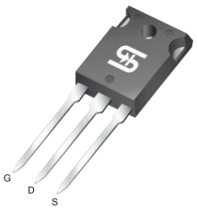
KEY PERFORMANCE PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{DS} @ $T_{j,max}$	650	V
$R_{DS(on)}$ (max)	69	mΩ
$Q_{g,typ}$	86	nC

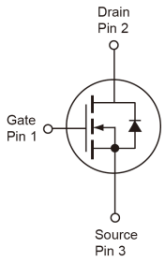
APPLICATIONS

- Switching applications
- HV motor driver
- Industrial

Pb-Free RoHS COMPLIANT HALOGEN FREE

TO-247





ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	T_C = 25°C	I_D	51	A
Pulsed Drain Current (Note 1)		I_{DM}	204	A
Total Power Dissipation @ T_C = 25°C		P_D	417	W
Single Pulse Avalanche Energy (Note 2)		E_{AS}	780	mJ
Single Pulse Avalanche Current (Note 2)		I_{AS}	5.6	A
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Junction to Case Thermal Resistance	$R_{\Theta JC}$	0.3	°C/W
Junction to Ambient Thermal Resistance (Note 3)	$R_{\Theta JA}$	50	°C/W

Notes:

1. Pulse Width ≤ 100μs.
2. L = 50mH, R_G = 25Ω, Starting T_J = 25°C.
3. $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. $R_{\Theta JA}$ is guaranteed by design while $R_{\Theta JA}$ is determined by the user's board design.

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static (Note 4)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 1mA	BV_{DSS}	600	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 3.5mA	$V_{GS(TH)}$	4	4.8	6	V
Gate Body Leakage	V_{GS} = ±30V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 600V, V_{GS} = 0V	I_{DSS}	--	--	100	μA
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 17A	$R_{DS(on)}$	--	55	69	mΩ
	V_{GS} = 12V, I_D = 17A		--	52	60	
Dynamic (Note 5)						
Total Gate Charge	V_{DS} = 480V, I_D = 51A, V_{GS} = 10V	Q_g	--	86	--	nC
Gate-Source Charge		Q_{gs}	--	27	--	
Gate-Drain Charge		Q_{gd}	--	50	--	
Input Capacitance	V_{DS} = 300V, V_{GS} = 0V, f = 100kHz	C_{iss}	--	3566	--	pF
Output Capacitance		C_{oss}	--	99	--	
Reverse Transfer Capacitance		C_{rss}	--	6	--	
Gate Resistance	f = 1.0Hz	R_g	--	0.9	--	Ω
Switching (Note 6)						
Turn-On Delay Time	V_{DD} = 300V, R_G = 3.3Ω, I_D = 51A, V_{GS} = 10V	$t_{d(on)}$	--	49	--	ns
Turn-On Rise Time		t_r	--	66	--	
Turn-Off Delay Time		$t_{d(off)}$	--	80	--	
Turn-Off Fall Time		t_f	--	37	--	
Source-Drain Diode						
Forward Voltage (Note 4)	I_S = 17A, V_{GS} = 0V	V_{SD}	--	0.9	1.5	V
Reverse Recovery Time	I_S = 25.5A, dI_F/dt = 100A/μs	t_{rr}	--	465	--	ns
Reverse Recovery Charge		Q_{rr}	--	10	--	μC

Notes:

4. Pulse test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.
5. Defined by design. Not subject to production test.
6. Switching time is essentially independent of operating temperature.

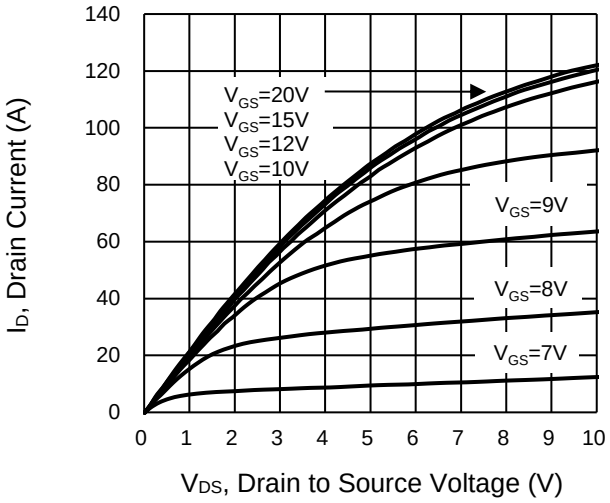
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM60NE069PW C0G	TO-247	30pcs / Tube

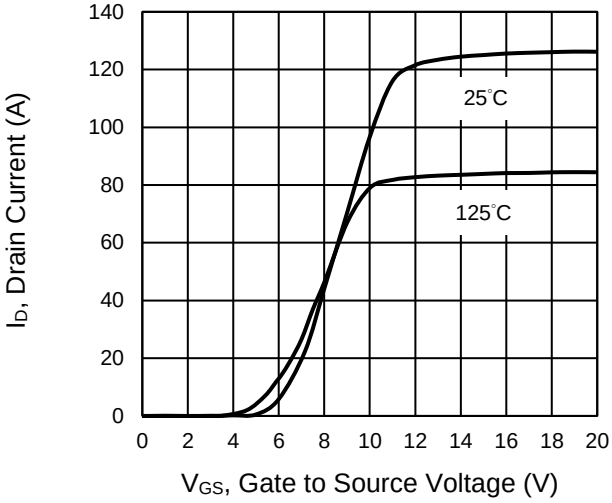
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

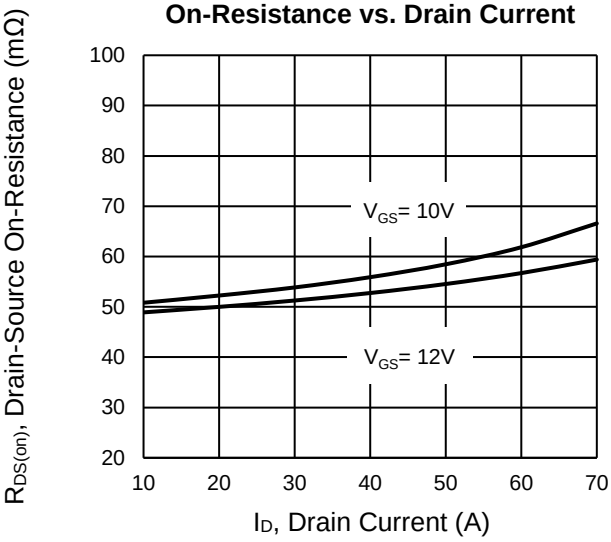
Output Characteristics



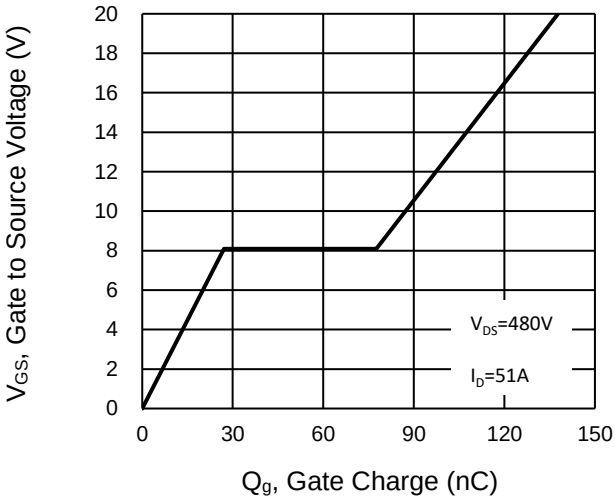
Transfer Characteristics



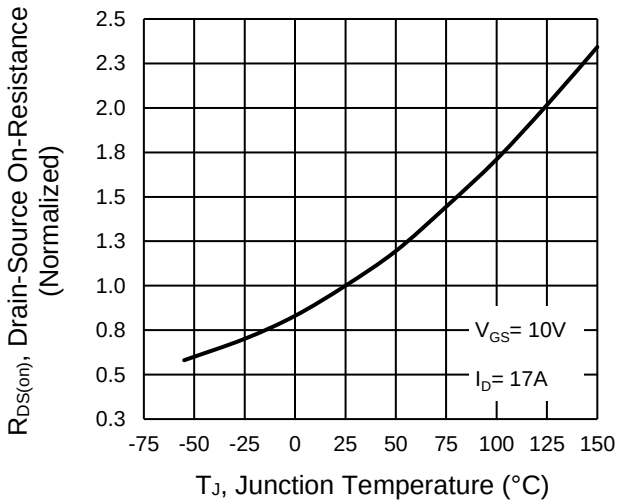
On-Resistance vs. Drain Current



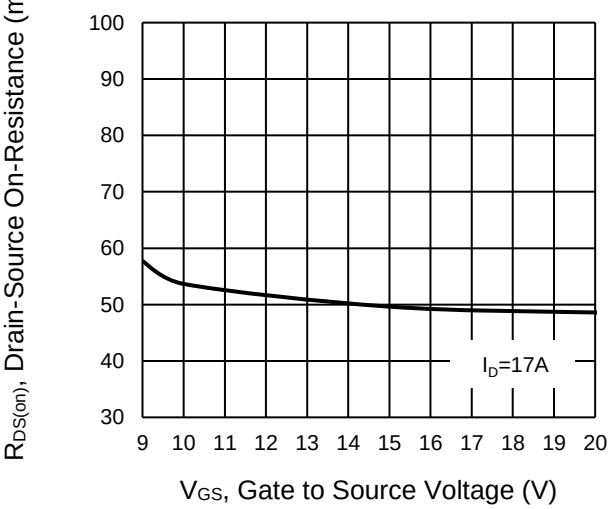
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



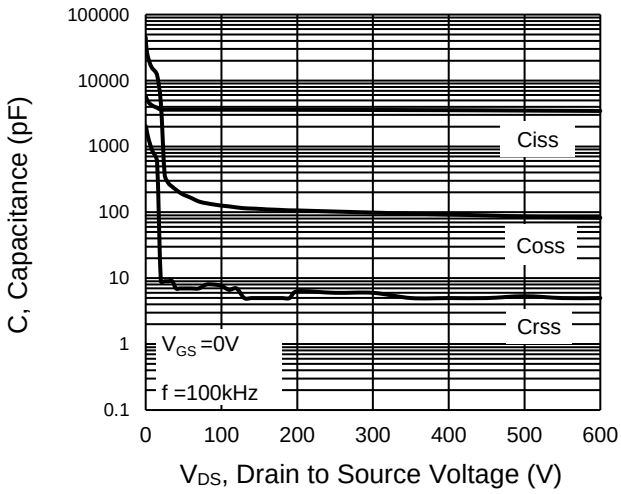
On-Resistance vs. Gate-Source Voltage



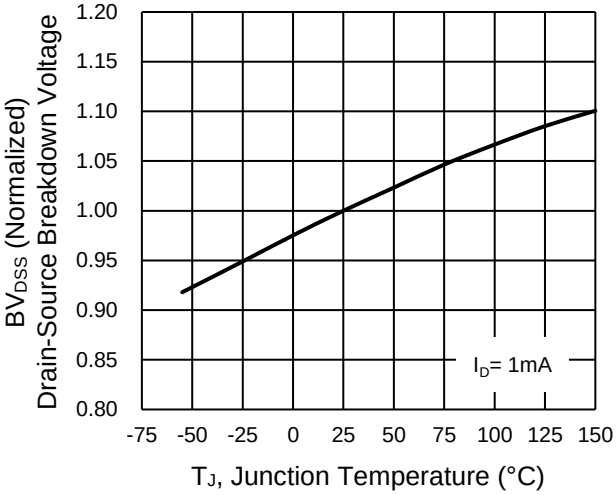
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

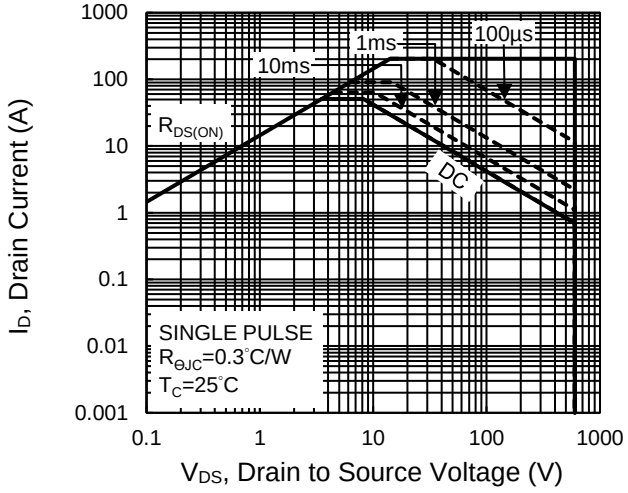
Capacitance vs. Drain-Source Voltage



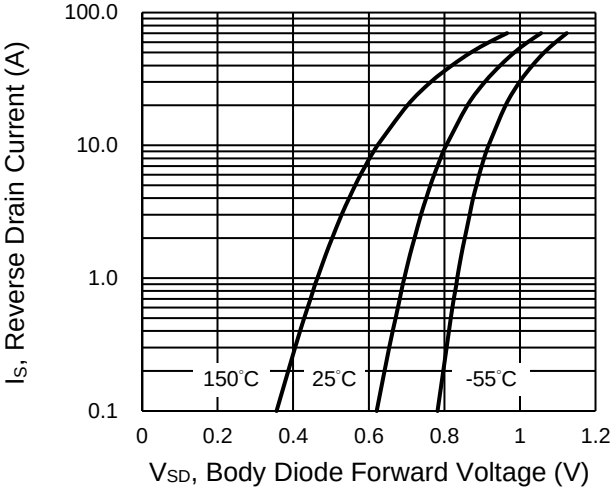
BV_{DSS} vs. Junction Temperature



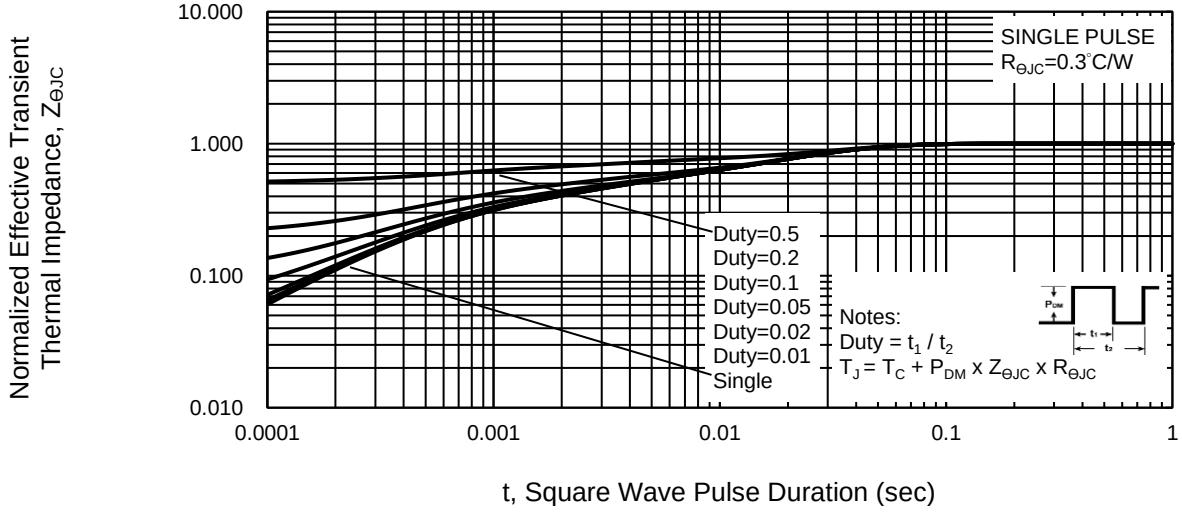
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage



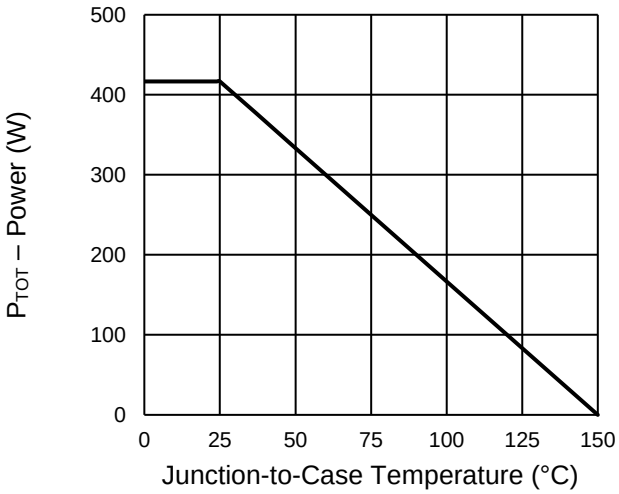
Normalized Thermal Transient Impedance, Junction-to-Case



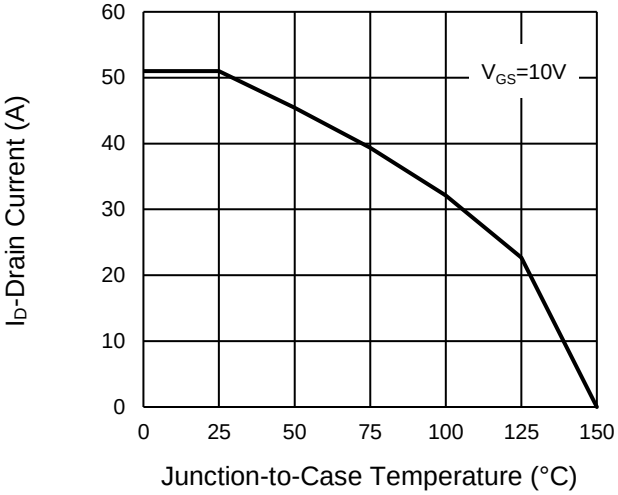
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

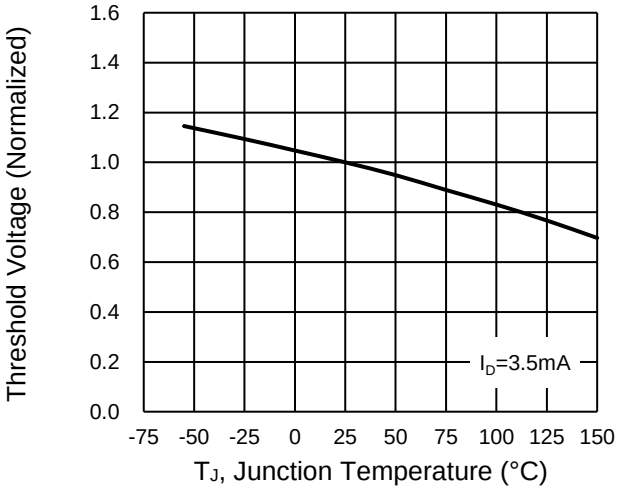
Power Dissipation



Drain Current

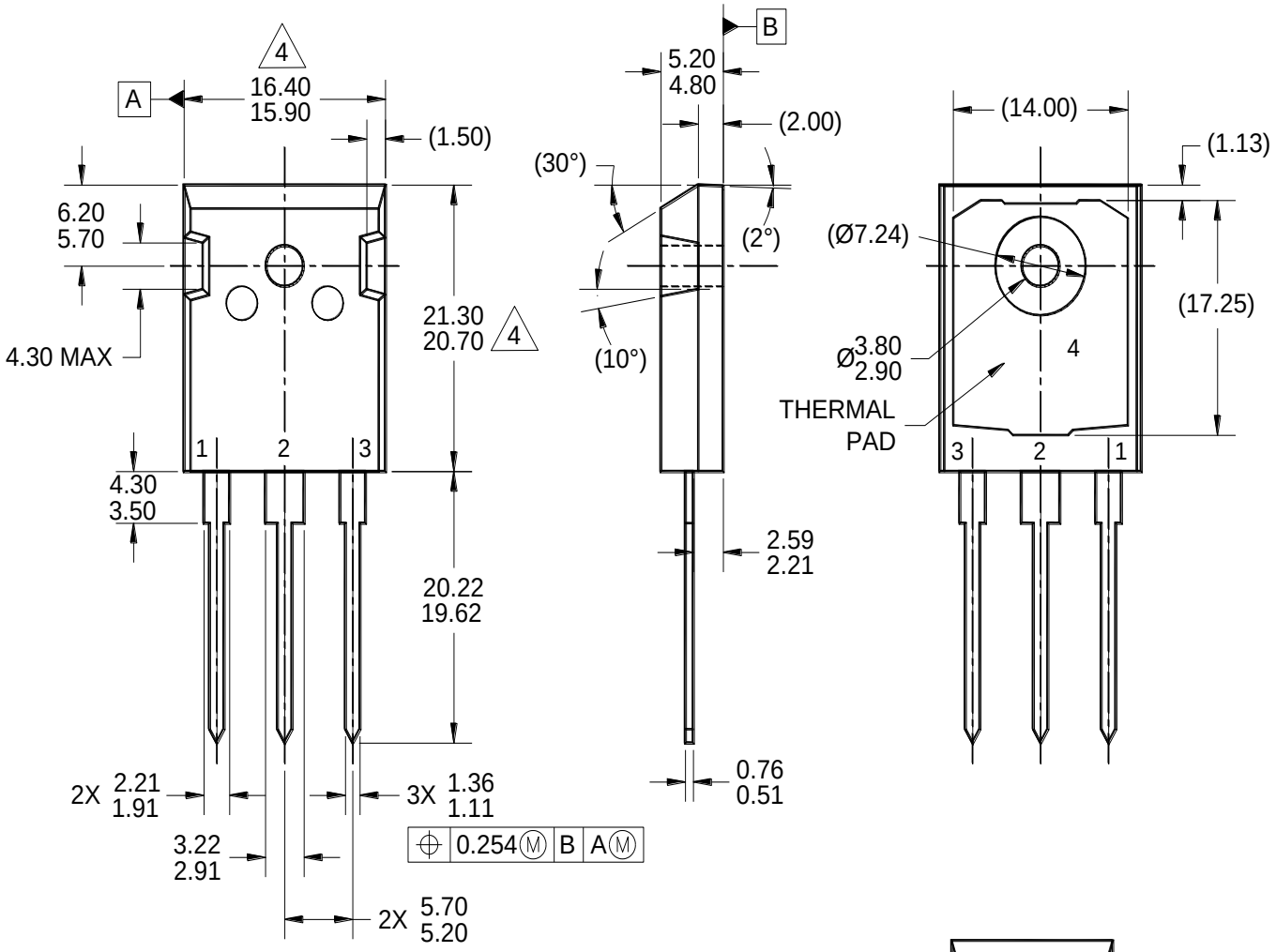


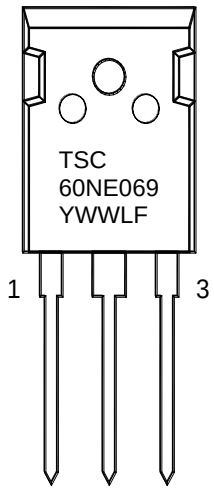
Normalized gate threshold voltage vs Temperature



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-247





NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: JEDEC TO-247, VARIATION AD, ISSUE E.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
5. DWG NO. REF: HQ2SD07-TO247AD-071 REV C.

MARKING DIAGRAM

Y	=	YEAR CODE
WW	=	WEEK CODE (01~52)
L	=	LOT CODE (1~9, A~Z)
F	=	FACTORY CODE

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