PerFET™ Power Transistor

FEATURES

- Excellent FOM
- Reliability meets AEC-Q101 requirements
- Wettable Flank leads for Enhanced AOI
- 100% UIS and Rg tested
- 175°C Operating Junction Temperature
- RoHS Compliant
- Halogen-Free

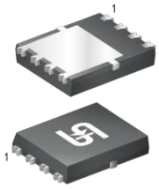
PRODUCT SUMMARY			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		100	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	4.8	mΩ
	V_{GS} = 4.5V	6.7	
Q_g	V_{GS} = 4.5V	24	nC

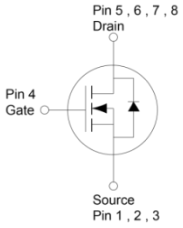
APPLICATIONS

- Solenoid and motor drivers
- DC-DC converters
- Load Switch
- SMPS

Pb-Free RoHS COMPLIANT HALOGEN FREE

PDFN56U





Note: MSL 1 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current, Silicon limited	T_C = 25°C	I_D	146	A
Continuous Drain Current (Note 1)	T_C = 25°C	I_D	100	A
	T_C = 100°C		100	
	T_A = 25°C		17	
Pulsed Drain Current (Note 2)		I_{DM}	400	A
Single Pulse Avalanche Current (Note 3)		I_{AS}	26.8	A
Single Pulse Avalanche Energy (Note 3)		EAS	108	mJ
Total Power Dissipation	T_C = 25°C	P_D	224	W
	T_C = 125°C		75	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +175	°C

THERMAL RESISTANCE			
PARAMETER	**SYMBOL**	**MAXIMUM**	**UNIT**
Thermal Resistance – Junction to Case	$R_{\Theta JC}$	0.67	°C/W
Thermal Resistance – Junction to Ambient (Note 4)	$R_{\Theta JA}$	50	°C/W

Notes:

1. Package current limit.
2. Pulse Width ≤ 100μs.
3. L = 0.3mH, V_{GS} = 10V, R_G = 25Ω, Starting T_J = 25°C.
4. Device on a PCB FR4 with 1 in^2 (single layer, 2 oz thick) copper area for drain connection.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 1mA	BV_{DSS}	100	--	--	V
Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	$V_{GS(TH)}$	1.4	1.6	2.2	V
Gate-Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V_{GS} = 0V, V_{DS} = 100V	I_{DSS}	--	--	1	μA
	V_{GS} = 0V, V_{DS} = 100V T_J = 125°C		--	--	100	
Drain-Source On-State Resistance (Note 5)	V_{GS} = 10V, I_D = 50A	$R_{DS(on)}$	--	3.7	4.8	mΩ
	V_{GS} = 4.5V, I_D = 50A		--	4.6	6.7	
Forward Transconductance (Note 5)	V_{DS} = 10V, I_D = 12.5A	g_{fs}	--	73	--	S
Dynamic (Note 6)						
Total Gate Charge	V_{GS} = 4.5V, V_{DS} = 50V, I_D = 17A	Q_g	--	24	--	nC
Total Gate Charge	V_{GS} = 10V, V_{DS} = 50V, I_D = 17A	Q_g	--	47	--	
Gate-Source Charge		Q_{gs}	--	9.2	--	
Gate-Drain Charge		Q_{gd}	--	8.1	--	
Input Capacitance	V_{DS} = 60V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	2964	--	pF
Output Capacitance		C_{oss}	--	489	--	
Reverse Transfer Capacitance		C_{rss}	--	32	--	
Gate Resistance	f = 1.0MHz	R_g	--	0.7	--	Ω
Switching (Note 7)						
Turn-On Delay Time	V_{GS} = 10V, V_{DS} = 50V, I_D = 17A, R_G = 6Ω	$t_{d(on)}$	--	12	--	ns
Rise Time		t_r	--	40	--	
Turn-Off Delay Time		$t_{d(off)}$	--	52	--	
Fall Time		t_f	--	82	--	
Source-Drain Diode						
Diode Forward Voltage (Note 5)	V_{GS} = 0V, I_S = 50A	V_{SD}	--	--	1.1	V
Reverse Recovery Time	I_S = 17A, di/dt = 100A/μs	t_{rr}	--	78	--	ns
Reverse Recovery Charge		Q_{rr}	--	158	--	nC

Notes:

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

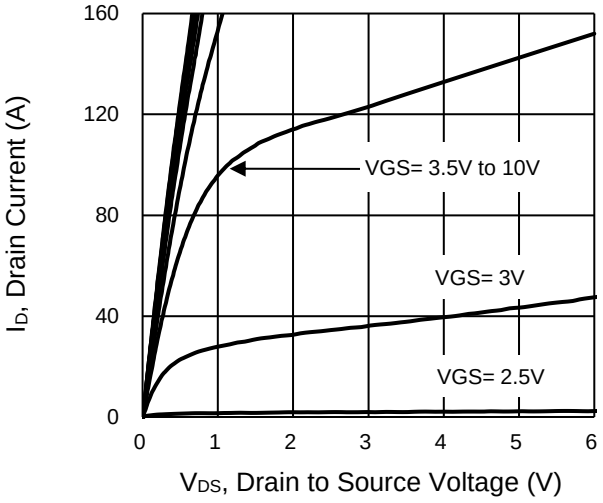
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM048NH10LCR RLG	PDFN56U	2,500pcs / 13” Reel

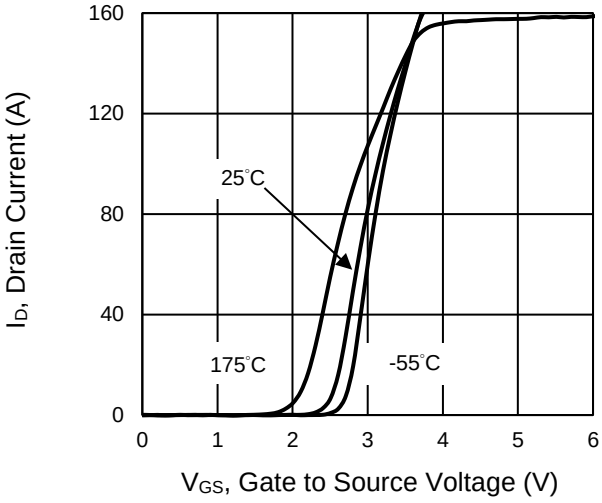
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

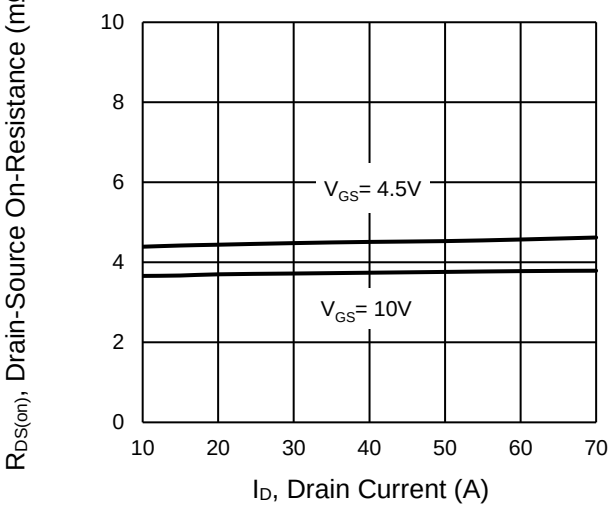
Output Characteristics



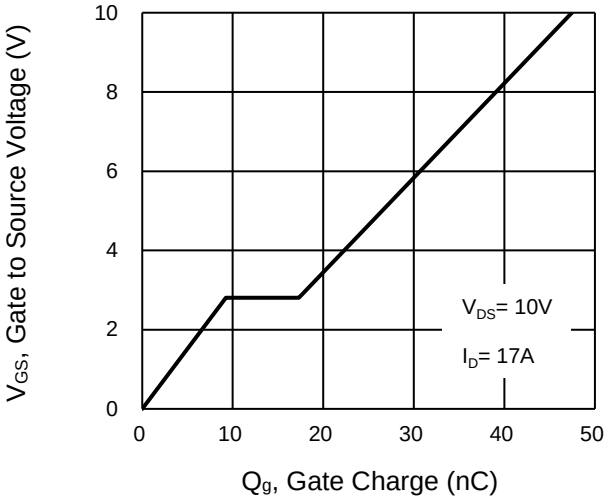
Transfer Characteristics



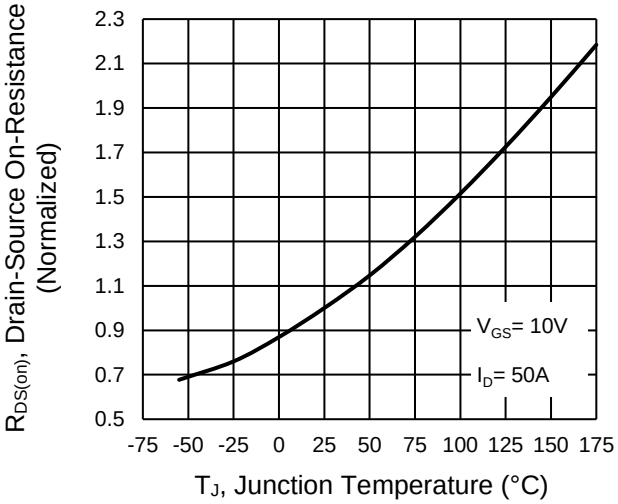
On-Resistance vs. Drain Current



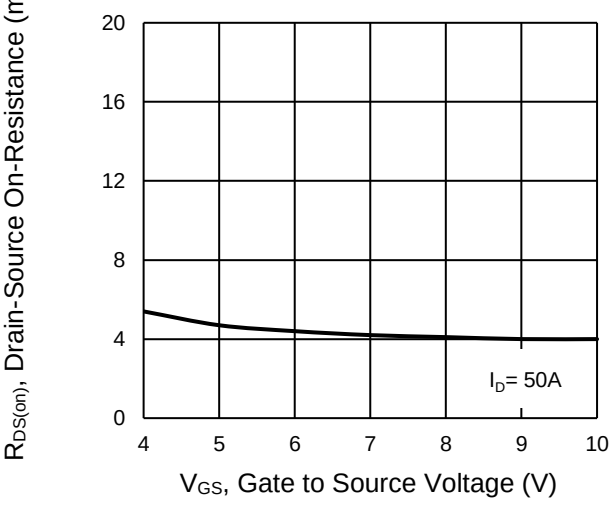
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



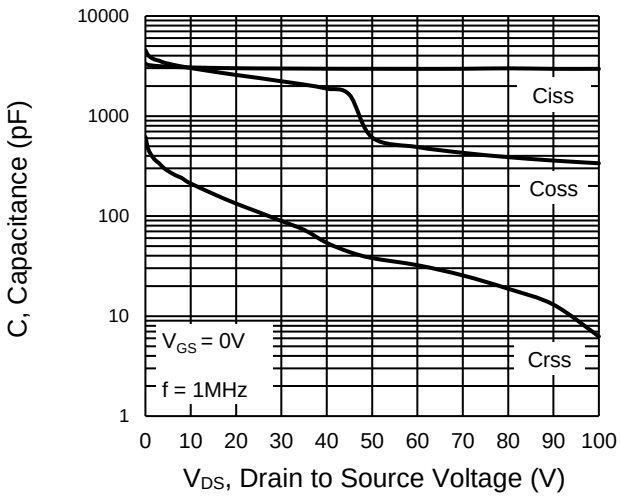
On-Resistance vs. Gate-Source Voltage



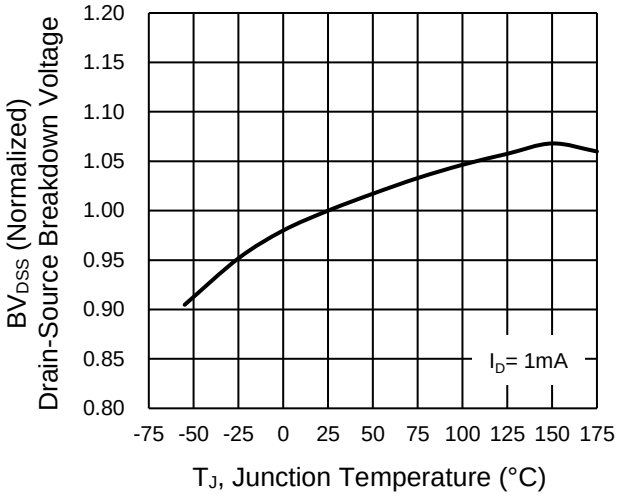
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

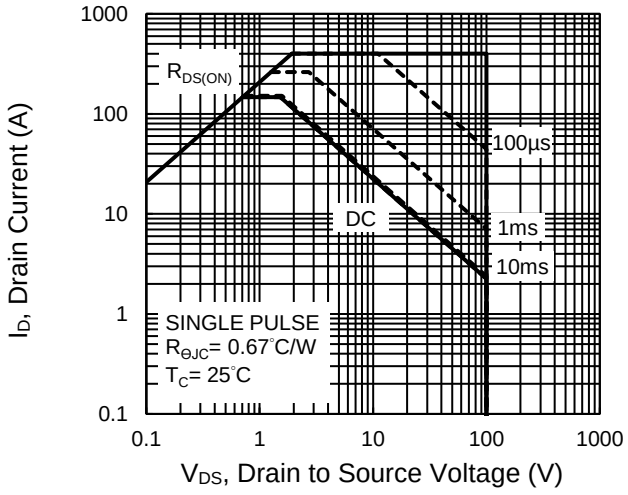
Capacitance vs. Drain-Source Voltage



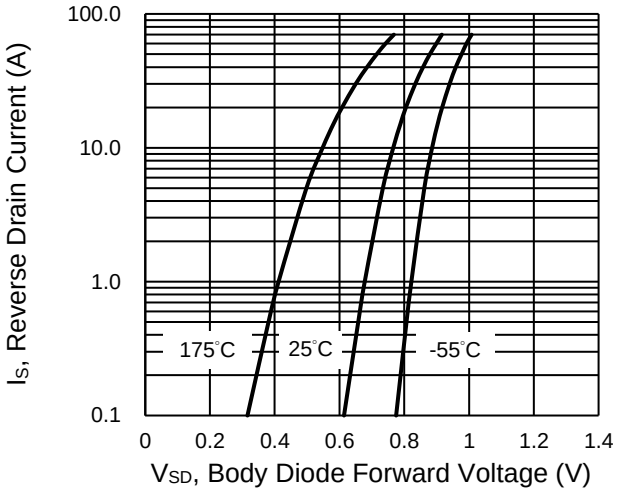
BV_{DSS} vs. Junction Temperature



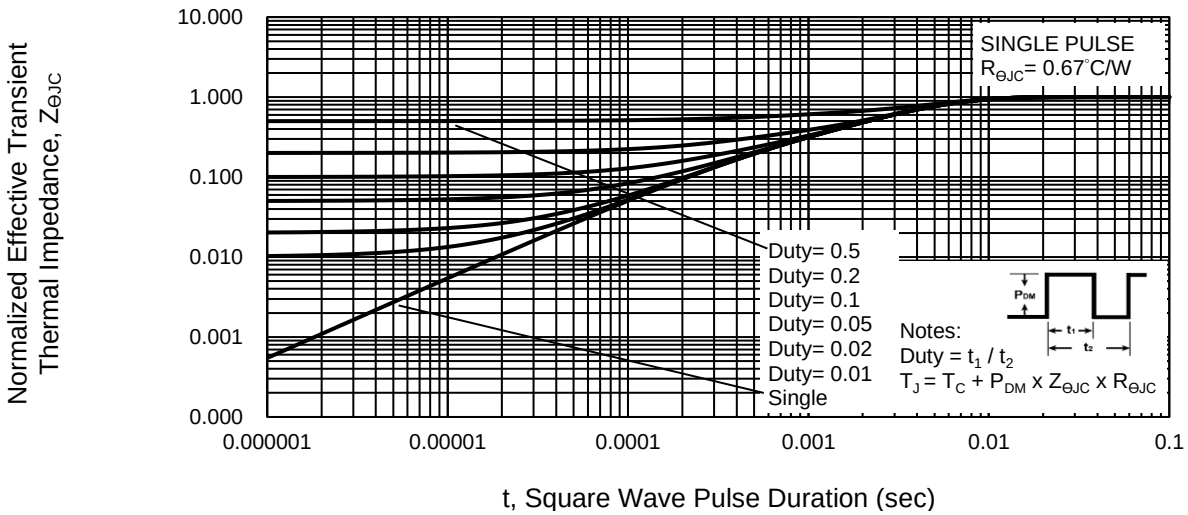
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage



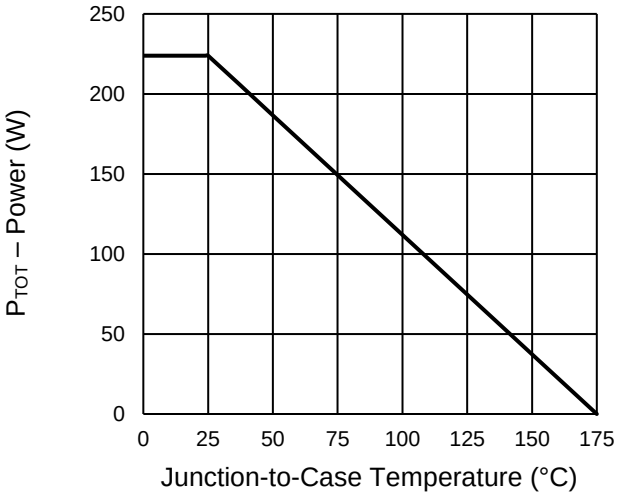
Normalized Thermal Transient Impedance, Junction-to-Case



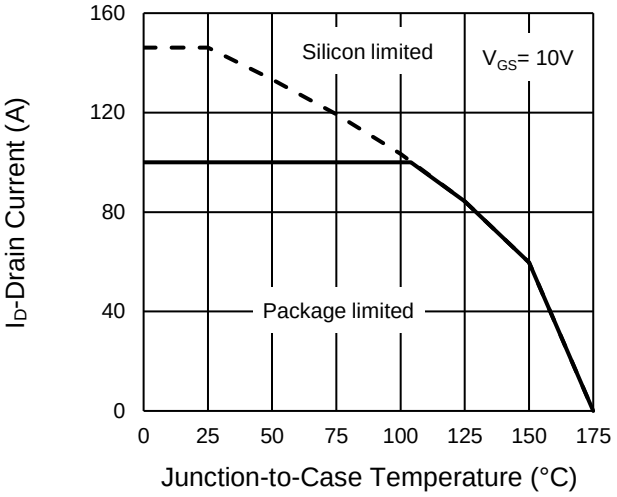
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

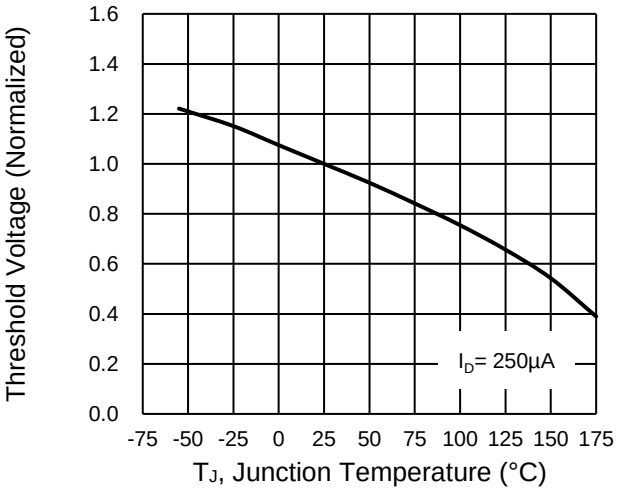
Power Dissipation



Drain Current

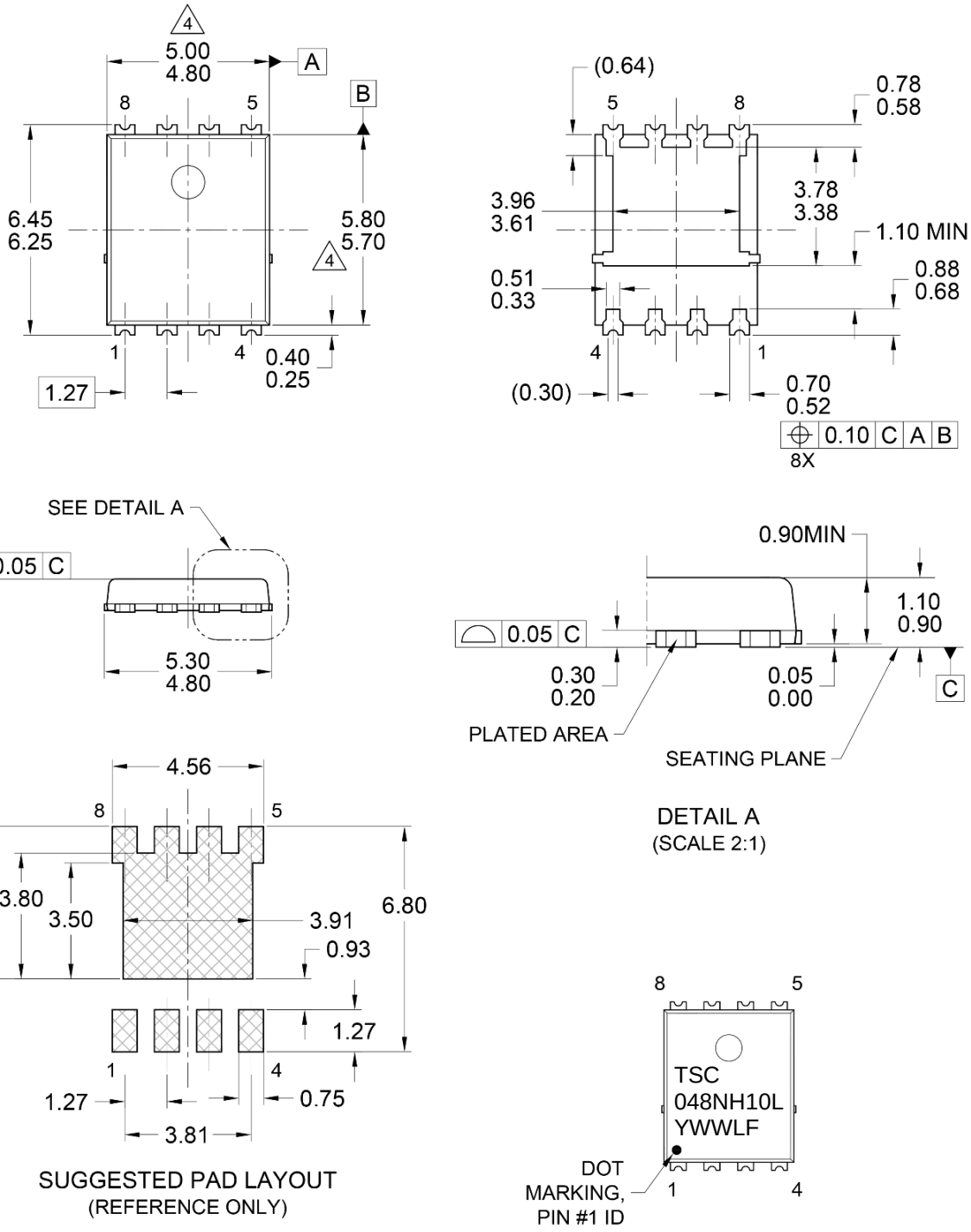


Normalized gate threshold voltage vs Temperature



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

PDFN56U



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: JEITA ED-7500B, EIAJ SC-111BB.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DWG NO. REF: HQ2SD07-PDFN56U-023 REV B.

048NH10L	= Device marking
Y	= Year code
WW	= Week code (01~52)
L	= Lot code (1~9,A~Z)
F	= Factory code

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