N-Channel Power MOSFET

FEATURES

- AEC-Q101 Qualified
- 100% UIS and Rg Tested
- RoHS Compliant
- Halogen-free

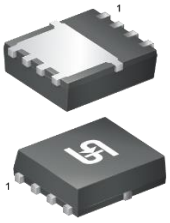
APPLICATIONS

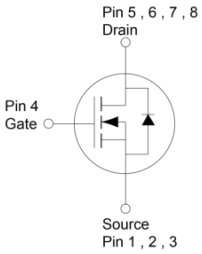
- 12V Automotive Systems
- Solenoid and Motor Control
- Automotive Transmission Control
- DC-DC Converters

KEY PERFORMANCE PARAMETERS			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		60	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	30	mΩ
	V_{GS} = 7V	36	
Q_g		16	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

PDFN33





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}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25°C	I_D	22	A
Pulsed Drain Current (Note 1)		I_{DM}	88	A
Total Power Dissipation	T_C = 25°C	P_D	30	W
	T_C = 125°C		6.1	
Total Power Dissipation	T_A = 25°C	P_D	2.3	W
	T_A = 125°C		0.5	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	27	mJ
Single Pulse Avalanche Current (Note 2)		I_{AS}	13.4	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	$R_{\Theta JC}$	4.1	°C/W
Junction to Ambient Thermal Resistance (Note 3)	$R_{\Theta JA}$	53	°C/W

Notes:

1. Pulse Width ≤ 100μs.
2. L = 0.3mH, V_{GS} = 20V, R_G = 25Ω, Starting T_J = 25°C.
3. Device on a PCB FR4 with 1 in^2 (single layer, 2 oz thickness) copper area for drain connection.

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 = 250μA	BV_{DSS}	60	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	1.8	2.6	3.8	V
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 60V, V_{GS} = 0V	I_{DSS}	--	--	1	μA
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 11A	$R_{DS(on)}$	--	25	30	mΩ
	V_{GS} = 7V, I_D = 11A		--	26	36	
Forward Transconductance	V_{DS} = 10V, I_D = 2.7A	g_{fs}	--	14	--	S
Dynamic (Note 5)						
Total Gate Charge	V_{DS} = 30V, I_D = 6A, V_{GS} = 10V	Q_g	--	16	--	nC
Gate-Source Charge		Q_{gs}	--	3.8	--	
Gate-Drain Charge		Q_{gd}	--	4.2	--	
Input Capacitance	V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	975	--	pF
Output Capacitance		C_{oss}	--	80	--	
Reverse Transfer Capacitance		C_{rss}	--	18	--	
Gate Resistance	f = 1.0MHz	R_g	--	2.5	--	Ω
Switching (Note 6)						
Turn-On Delay Time	V_{DD} = 30V, R_G = 3.3Ω, I_D = 6A, V_{GS} = 10V	$t_{d(on)}$	--	7.9	--	ns
Turn-On Rise Time		t_r	--	19	--	
Turn-Off Delay Time		$t_{d(off)}$	--	18	--	
Turn-Off Fall Time		t_f	--	3.1	--	
Source-Drain Diode						
Forward Voltage (Note 4)	I_S = 11A, V_{GS} = 0V	V_{SD}	--	0.8	1.2	V
Reverse Recovery Time	I_S = 6A, dI_F/dt = 100A/μs	t_{rr}	--	16	--	ns
Reverse Recovery Charge		Q_{rr}	--	12	--	nC

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.

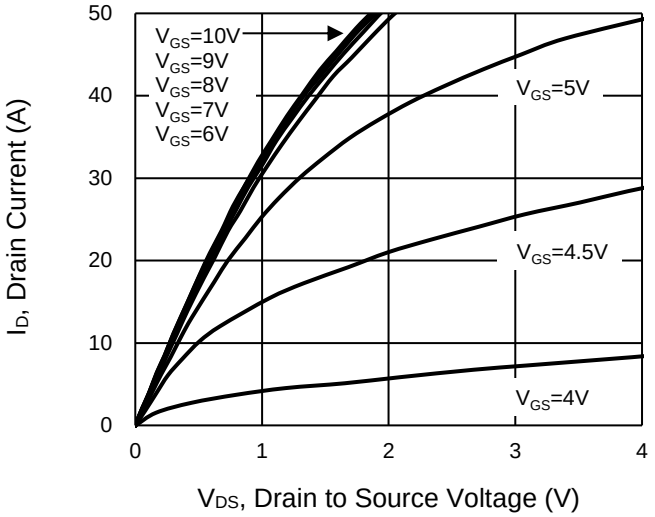
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TQM300NB06CV RGG	PDFN33	5,000pcs / 13” Reel

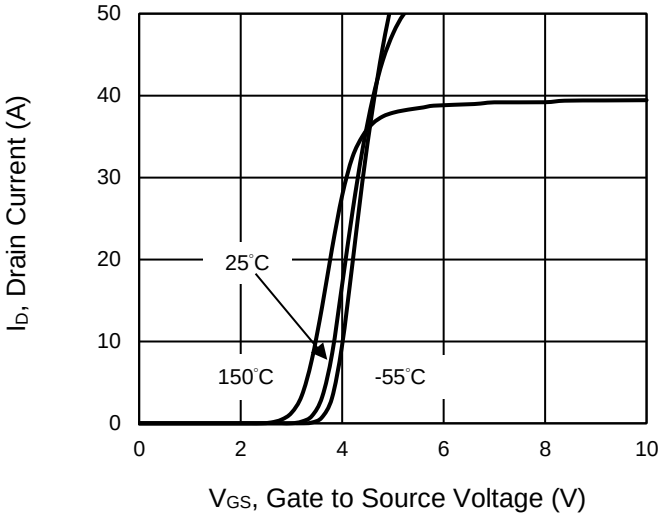
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

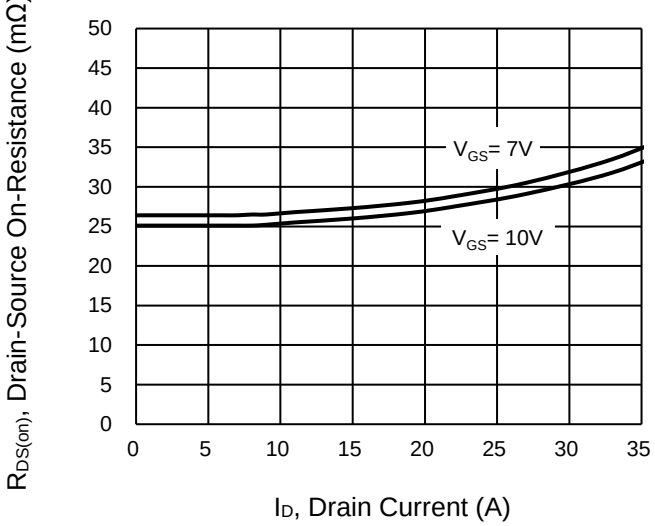
Output Characteristics



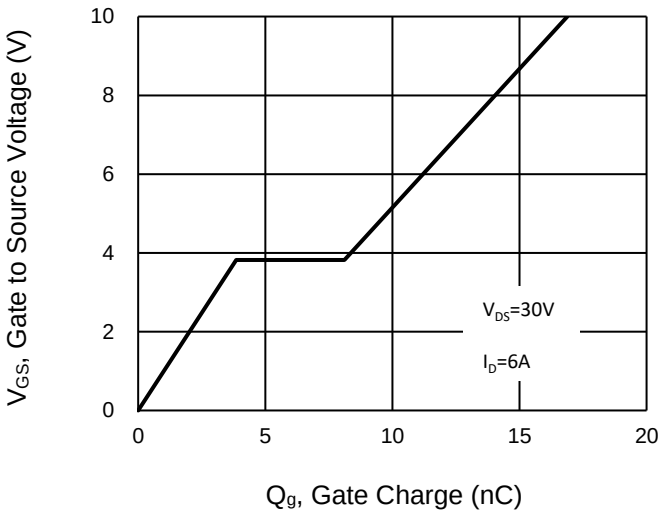
Transfer Characteristics



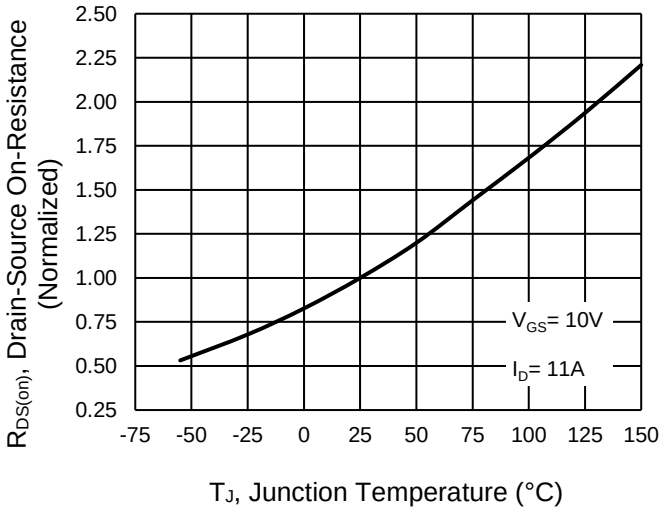
On-Resistance vs. Drain Current



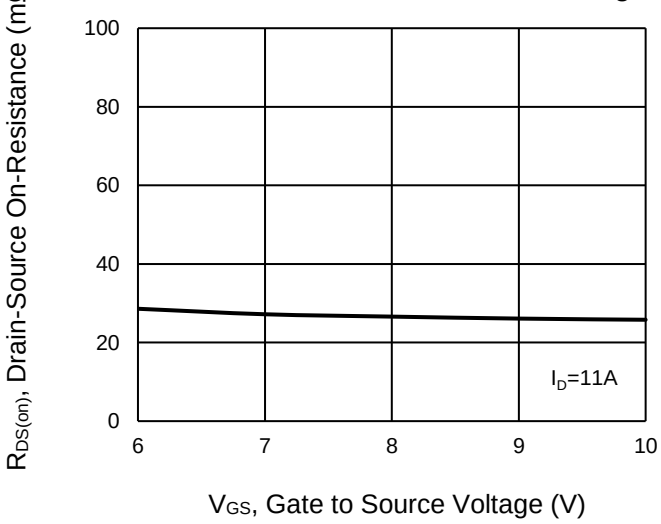
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



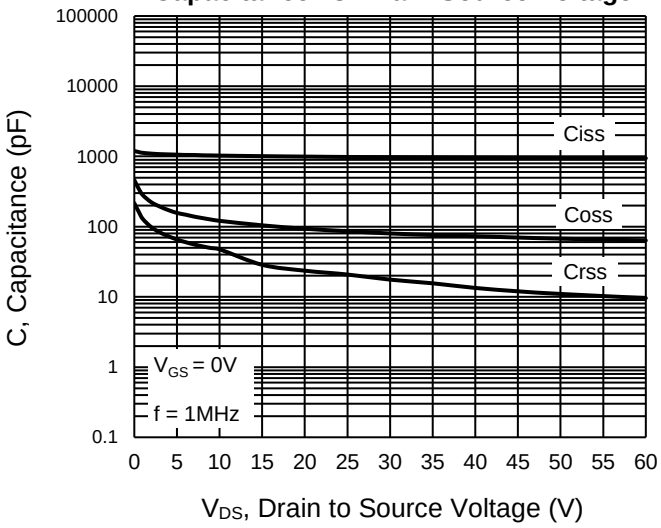
On-Resistance vs. Gate-Source Voltage



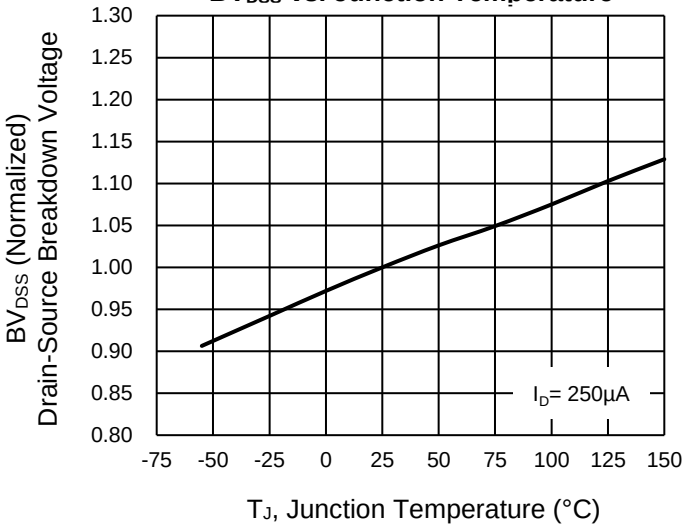
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

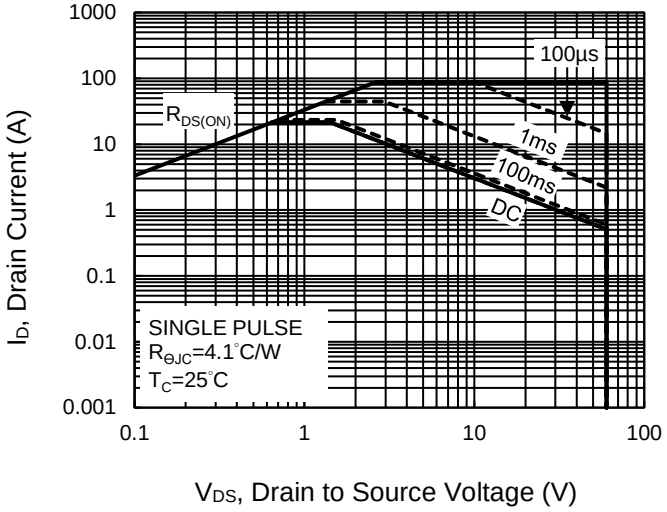
Capacitance vs. Drain-Source Voltage



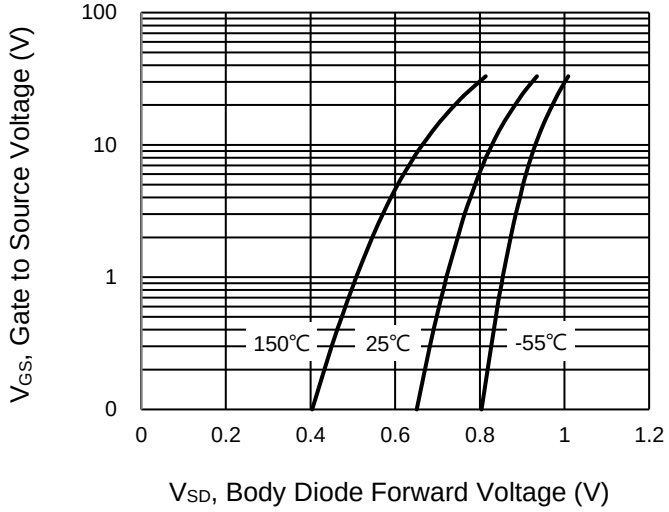
BV_{DSS} vs. Junction Temperature



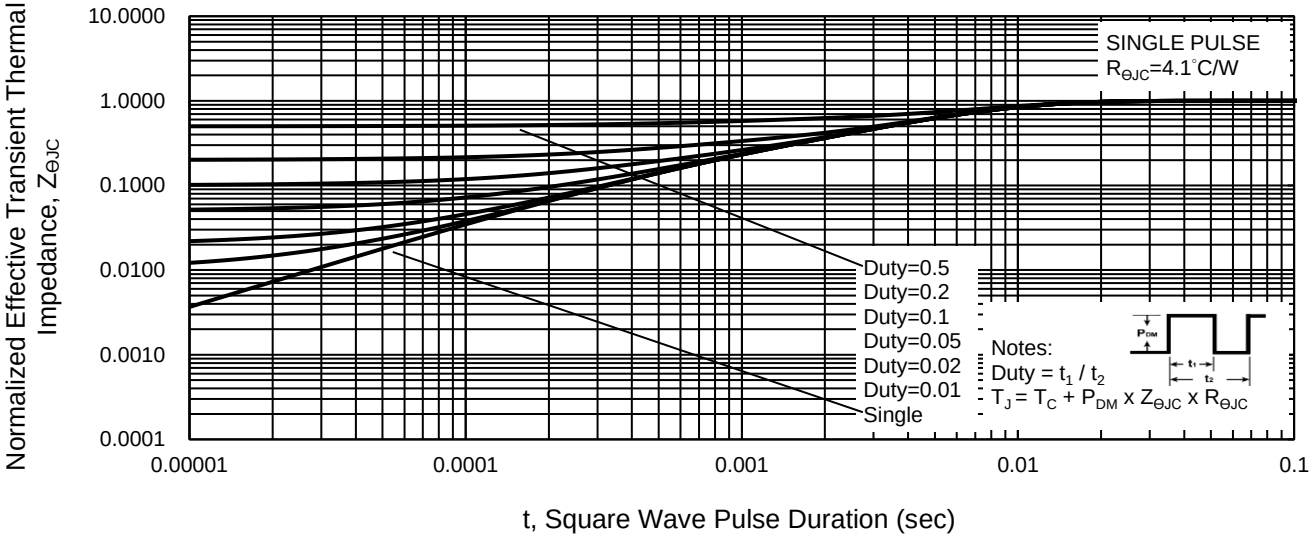
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage



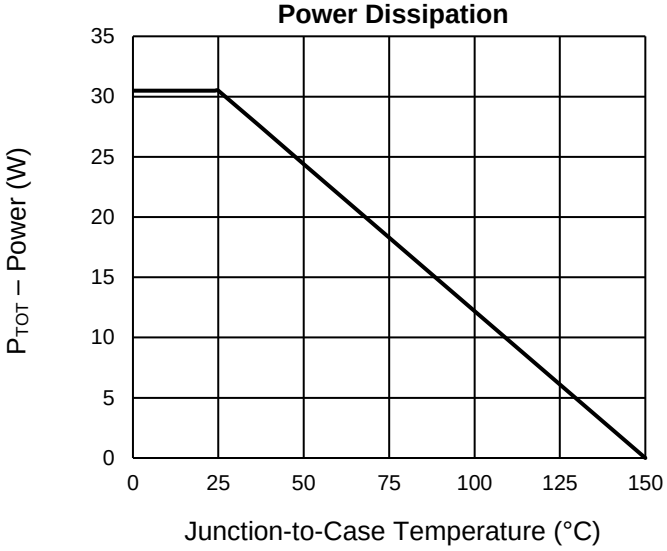
Normalized Thermal Transient Impedance, Junction-to-Case



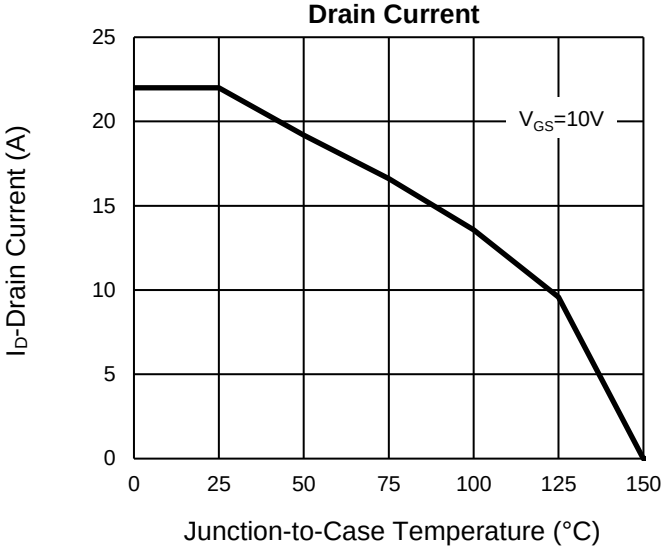
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

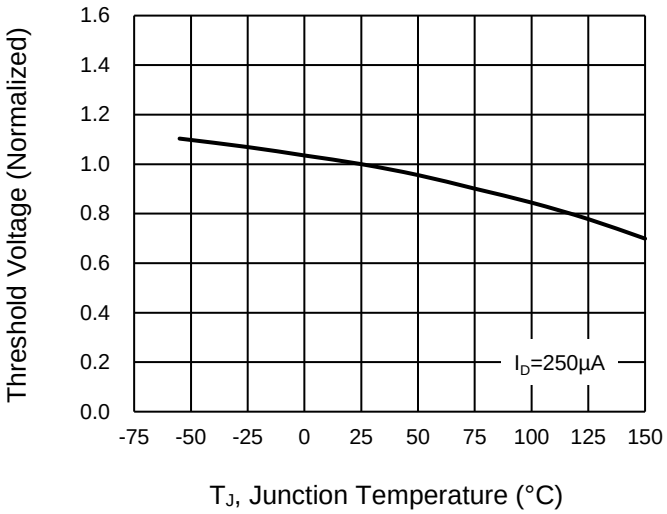
Power Dissipation



Drain Current

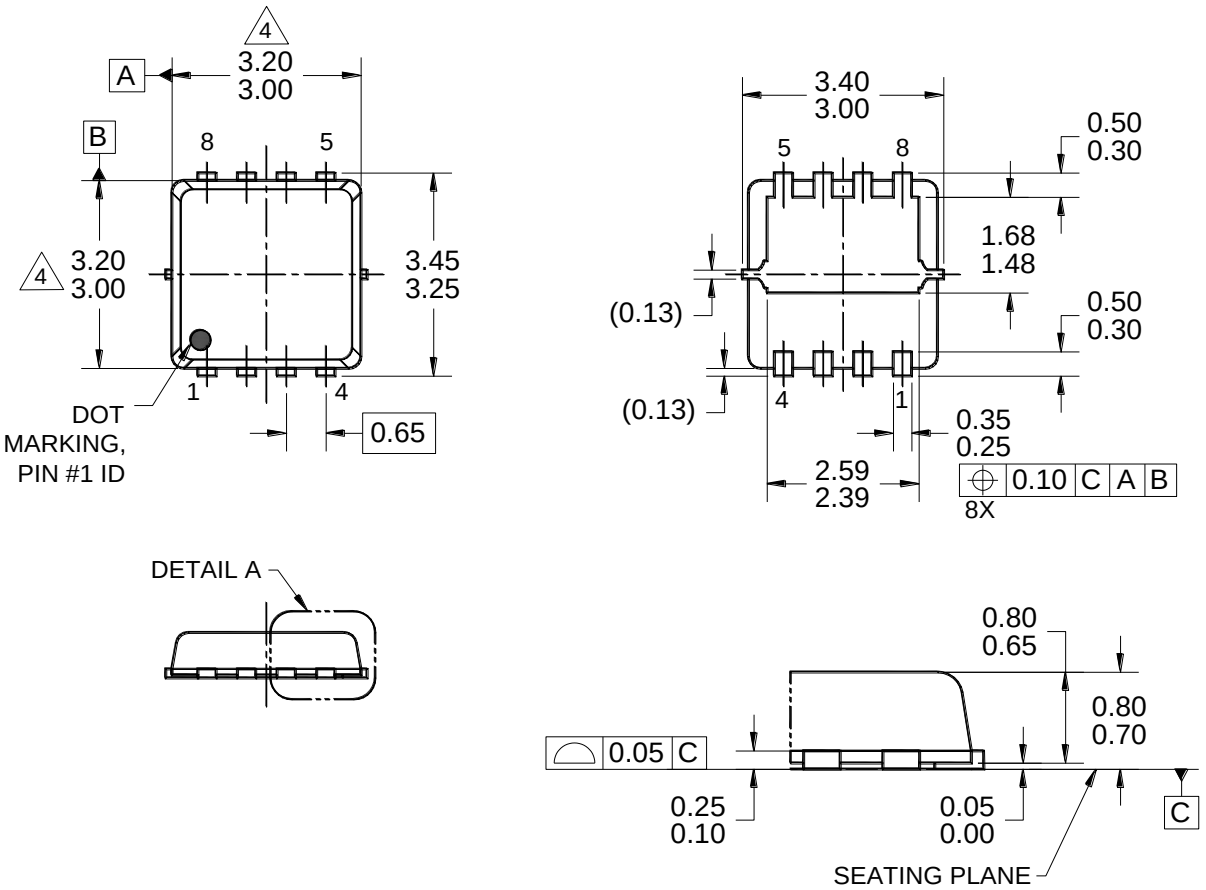


Normalized gate threshold voltage vs Temperature



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

PDFN33



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: EIAJ SC-119.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DWG NO. REF: HQ2SD07-PDFN33R-121 REV A.

Y = YEAR CODE
WW = WEEK CODE (01~52)
L = LOT CODE (1~9, A~Z)
F = FACTORY CODE
_ = AEC-Q101 QUALIFIED

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