

N-Channel Power MOSFET

FEATURES

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

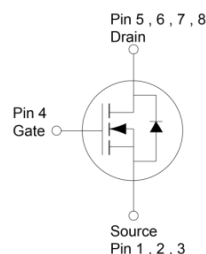
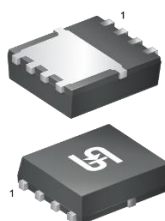
APPLICATIONS

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

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
V_{DS}	40	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	13
	$V_{GS} = 7V$	16
Q_g	18	nC



PDFN33



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

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	38	A
Pulsed Drain Current (Note 1)	I_{DM}	152	A
Total Power Dissipation	P_D	35	W
		6.9	
Total Power Dissipation	P_D	2.4	W
		0.5	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	37	mJ
Single Pulse Avalanche Current (Note 2)	I_{AS}	15.7	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	3.6	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance (Note 3)	$R_{\theta JA}$	53	$^\circ\text{C/W}$

Notes:

1. Pulse Width $\leq 100\mu\text{s}$.
2. $L = 0.3\text{mH}$, $V_{GS} = 20V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$.
3. Device on a PCB FR4 with 1 in² (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}	40	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	V _{GS(TH)}	1.8	2.5	3.8	V
Gate Body Leakage	V _{GS} = ±20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 40V, V _{GS} = 0V	I _{DSS}	--	--	1	μA
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 19A	R _{DS(on)}	--	9.6	13	mΩ
	V _{GS} = 7V, I _D = 19A		--	11	16	
Forward Transconductance	V _{DS} = 10V, I _D = 5A	g _{fs}	--	23	--	S
Dynamic (Note 5)						
Total Gate Charge	V _{DS} = 20V, I _D = 9.7A, V _{GS} = 10V	Q _g	--	18	--	nC
Gate-Source Charge		Q _{gs}	--	3.9	--	
Gate-Drain Charge		Q _{gd}	--	5	--	
Input Capacitance	V _{DS} = 20V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	994	--	pF
Output Capacitance		C _{oss}	--	122	--	
Reverse Transfer Capacitance		C _{rss}	--	70	--	
Gate Resistance	f = 1.0MHz	R _g	--	2	--	Ω
Switching (Note 6)						
Turn-On Delay Time	V _{DD} = 20V, R _G = 3.3Ω, I _D = 9.7A, V _{GS} = 10V	t _{d(on)}	--	8.6	--	ns
Turn-On Rise Time		t _r	--	37	--	
Turn-Off Delay Time		t _{d(off)}	--	18	--	
Turn-Off Fall Time		t _f	--	4.8	--	
Source-Drain Diode						
Forward Voltage (Note 4)	I _S = 19A, V _{GS} = 0V	V _{SD}	--	0.9	1.2	V
Reverse Recovery Time	I _S = 9.7A	t _{rr}	--	14	--	ns
Reverse Recovery Charge	dI _F /dt = 100A/μs	Q _{rr}	--	6.8	--	nC

Notes:

- Pulse test: Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- Defined by design. Not subject to production test.
- Switching time is essentially independent of operating temperature.

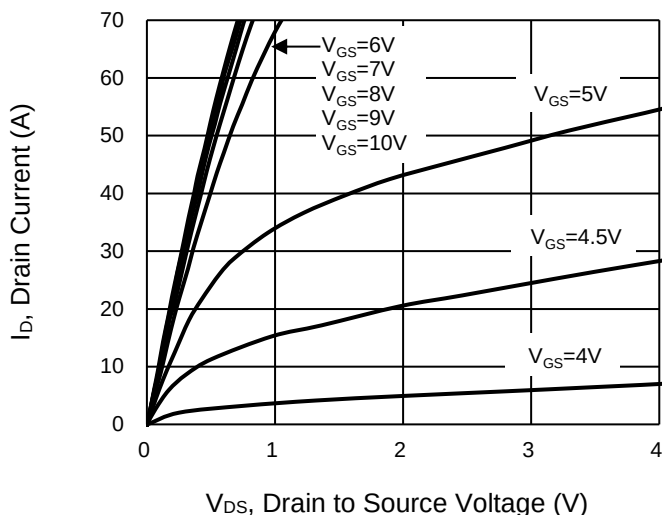
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TQM130NB04CV RGG	PDFN33	5,000pcs / 13" Reel

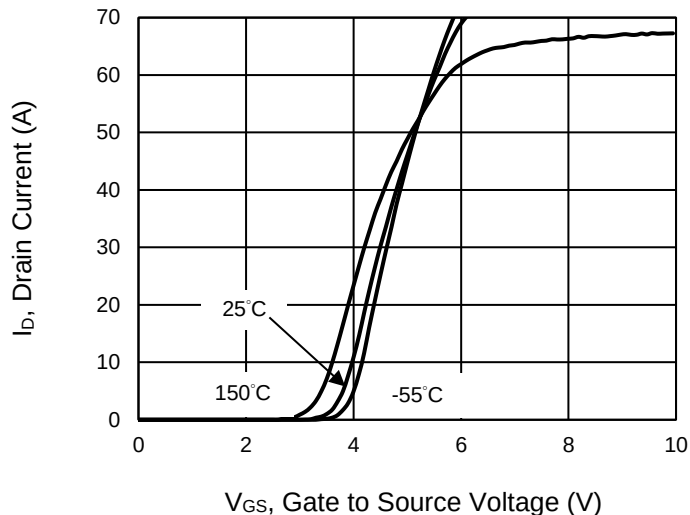
CHARACTERISTICS CURVES

($T_c = 25^\circ\text{C}$ unless otherwise noted)

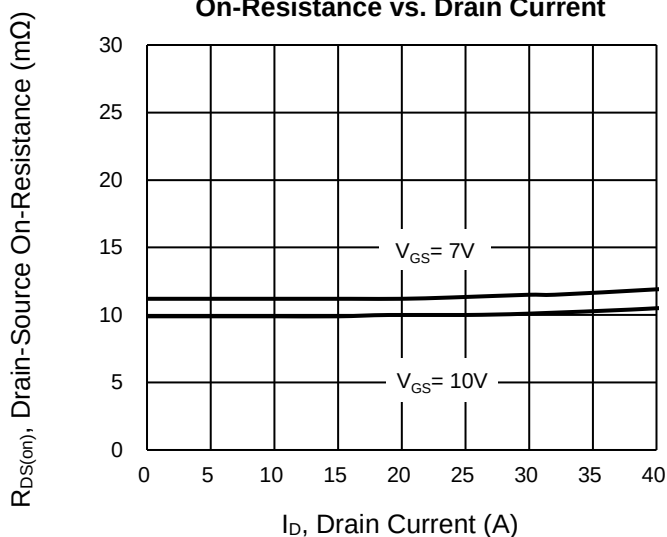
Output Characteristics



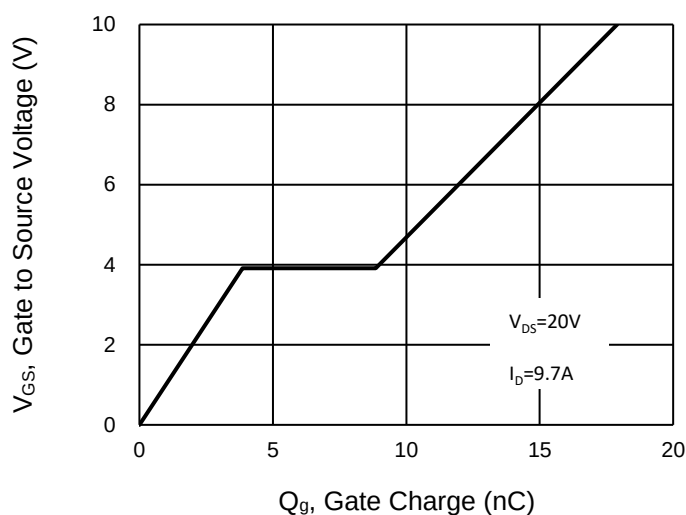
Transfer Characteristics



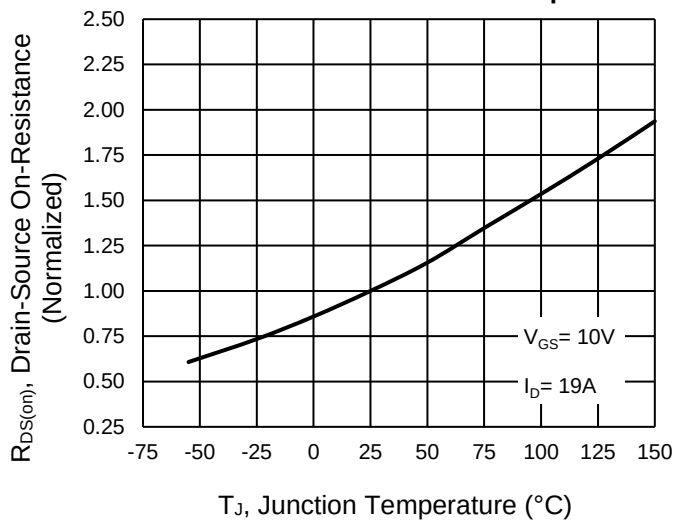
On-Resistance vs. Drain Current



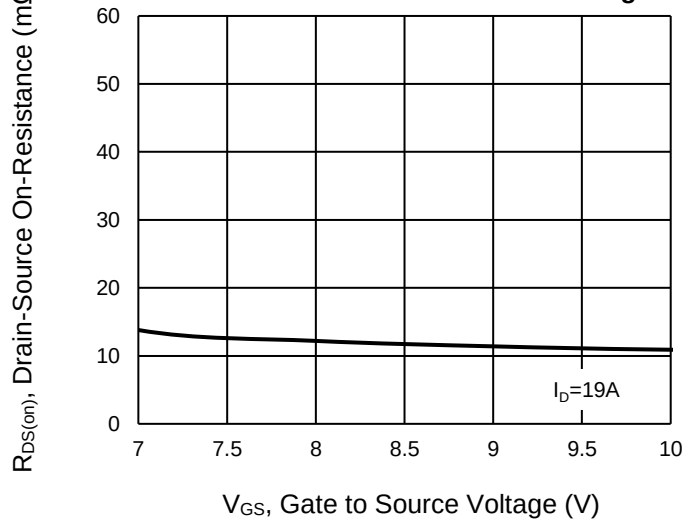
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature

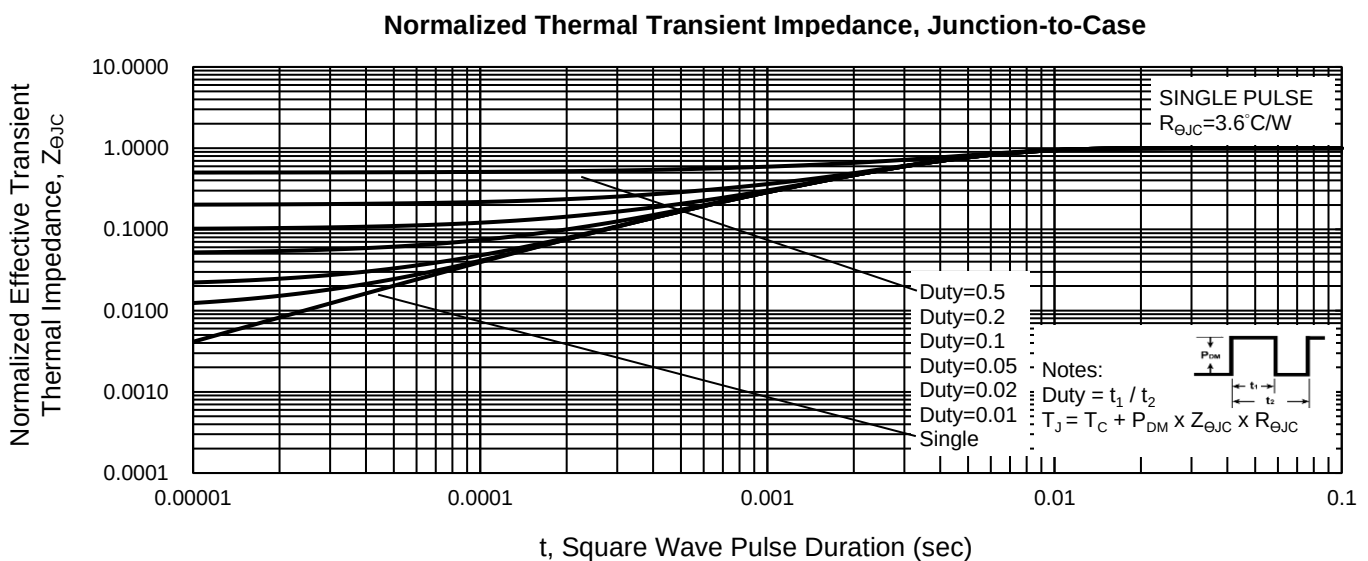
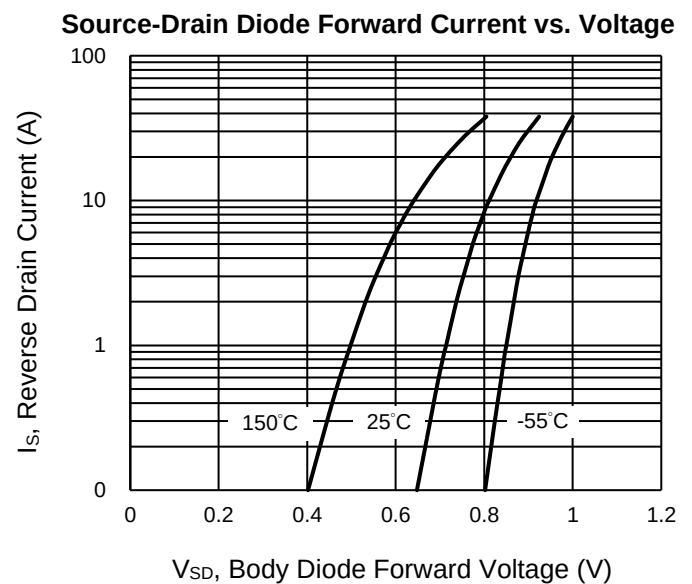
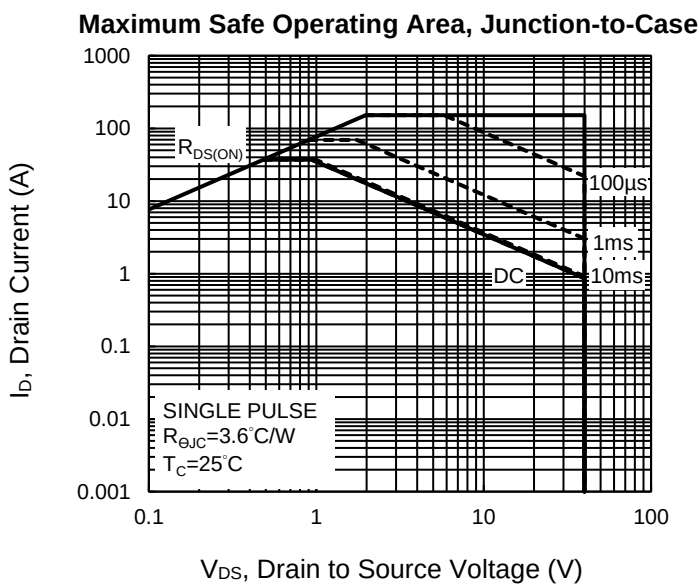
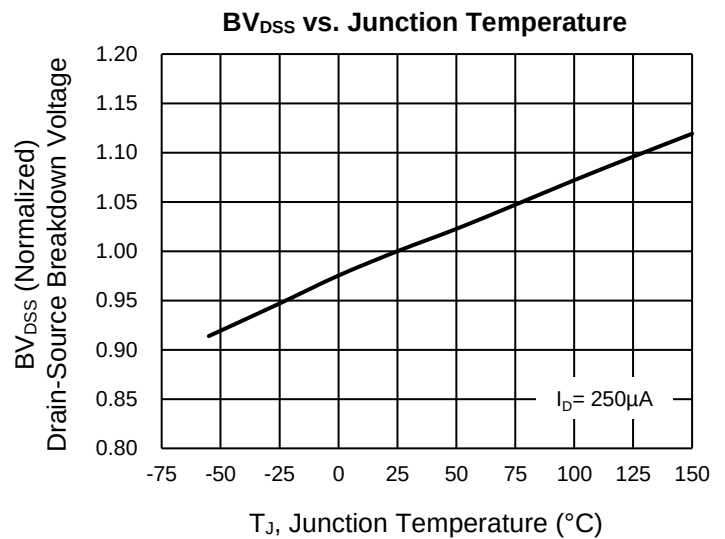
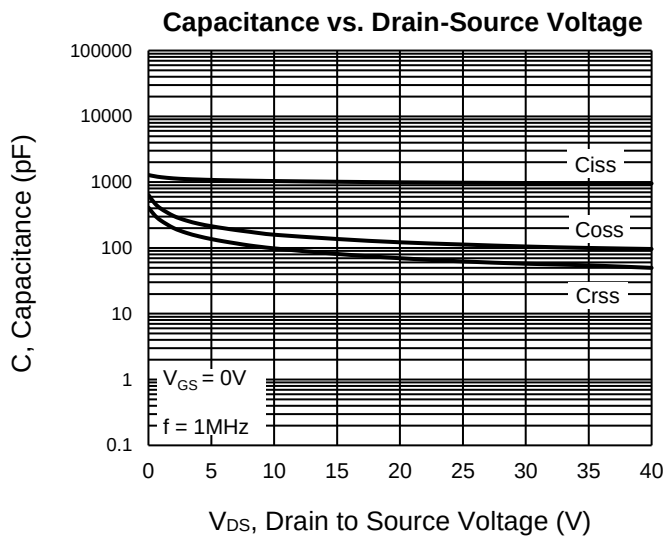


On-Resistance vs. Gate-Source Voltage



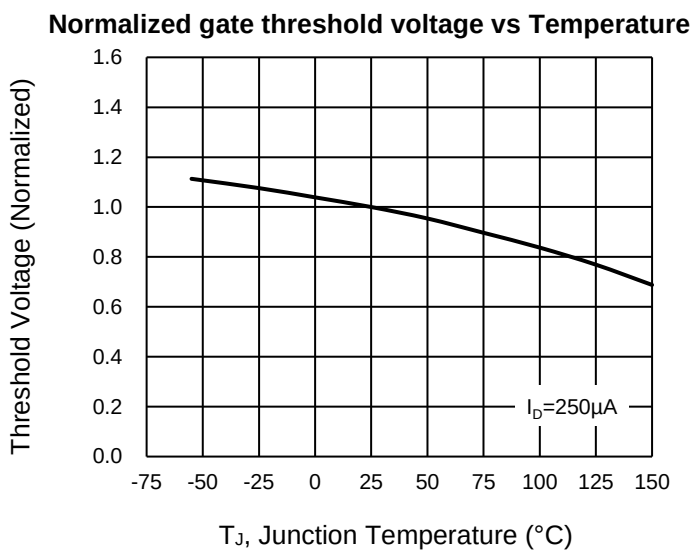
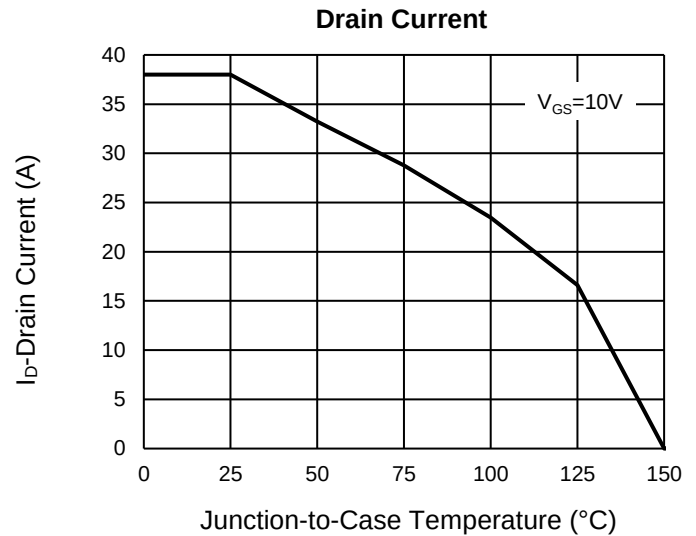
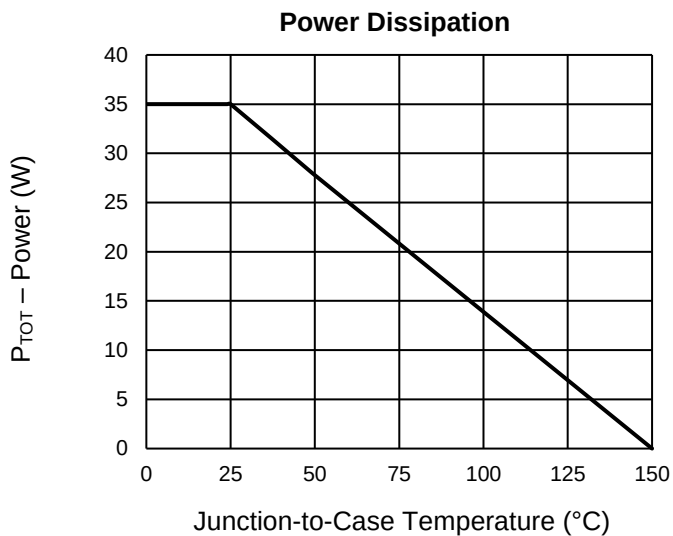
CHARACTERISTICS CURVES

($T_C = 25^\circ\text{C}$ unless otherwise noted)



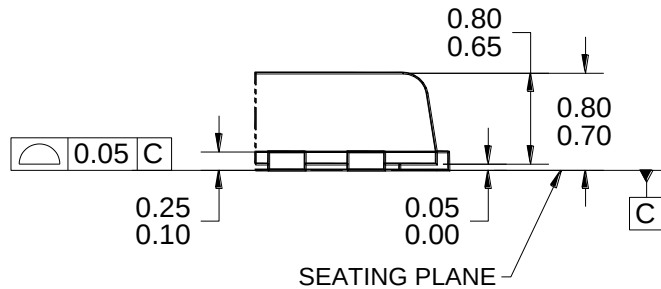
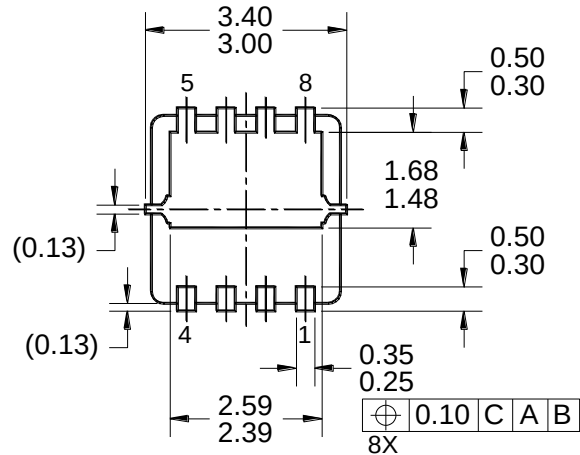
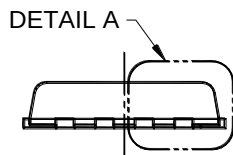
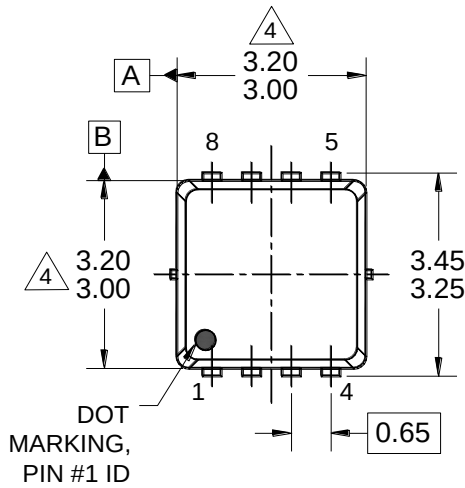
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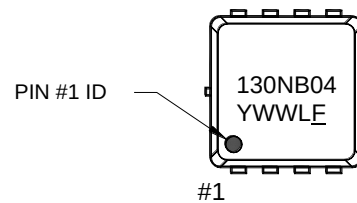
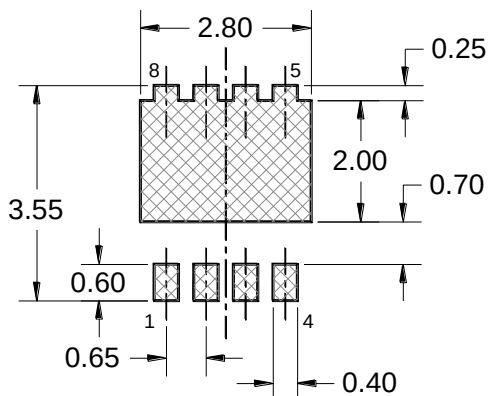


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

PDFN33



DETAIL A
(SCALE 2:1)



MARKING DIAGRAM

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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