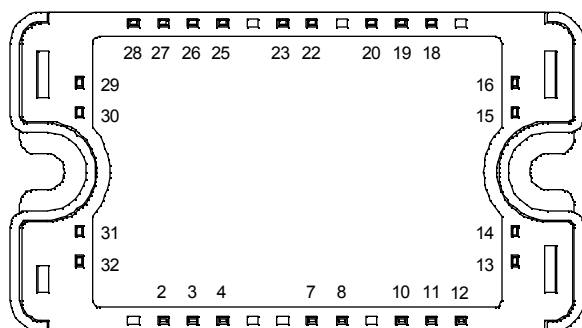
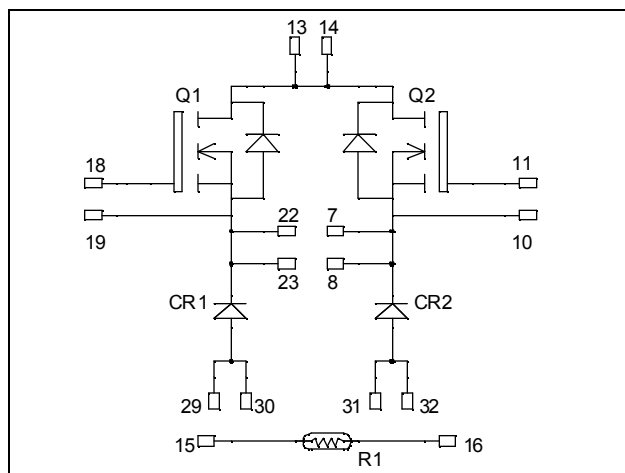


Dual Buck chopper MOSFET Power Module

$V_{DSS} = 500V$

$R_{DSon} = 100m\Omega \text{ max @ } T_j = 25^\circ C$

$I_D = 37A \text{ @ } T_c = 25^\circ C$



All multiple inputs and outputs must be shorted together
Example: 13/14 ; 29/30 ; 22/23 ...

Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- Power MOS 7[®] MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
- Internal thermistor for temperature monitoring
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- Each leg can be easily paralleled to achieve a single buck of twice the current capability

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	140	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	100	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	W
I_{AR}	Avalanche current (repetitive and non repetitive)	41	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	1600	



CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0\text{V}$ $V_{DS} = 500\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			100 500	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 18.5\text{A}$				100	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 1\text{mA}$		3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$				± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$			4367		pF
C_{oss}	Output Capacitance	$V_{DS} = 25\text{V}$			894		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$			61		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$			96		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 250\text{V}$			24		
Q_{gd}	Gate – Drain Charge	$I_D = 37\text{A}$			49		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15\text{V}$ $V_{Bus} = 333\text{V}$ $I_D = 37\text{A}$ $R_G = 5\Omega$			15		ns
T_r	Rise Time				21		
$T_{d(off)}$	Turn-off Delay Time				73		
T_f	Fall Time				52		
E_{on}	Turn-on Switching Energy ①	Inductive switching @ 25°C $V_{GS} = 15\text{V}, V_{Bus} = 333\text{V}$ $I_D = 37\text{A}, R_G = 5\Omega$			566		μJ
E_{off}	Turn-off Switching Energy ②				545		
E_{on}	Turn-on Switching Energy ①	Inductive switching @ 125°C $V_{GS} = 15\text{V}, V_{Bus} = 333\text{V}$ $I_D = 37\text{A}, R_G = 5\Omega$			931		μJ
E_{off}	Turn-off Switching Energy ②				635		

Diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V
I _{RM}	Maximum Reverse Leakage Current	V _R =600V	T _j = 25°C			250	μA
			T _j = 125°C			750	
I _{F(AV)}	Maximum Average Forward Current	50% duty cycle	T _c = 70°C		30		A
V _F	Diode Forward Voltage	I _F = 30A			2.2	2.7	V
		I _F = 60A			2.7		
		I _F = 30A	T _j = 150°C		1.5		
t _{rr}	Reverse Recovery Time	I _F = 30A V _R = 400V di/dt=200A/μs	T _j = 25°C		74		ns
			T _j = 100°C		74		
Q _{rr}	Reverse Recovery Charge			T _j = 25°C		123	
			T _j = 100°C		288		

① E_{on} includes diode reverse recovery.

② In accordance with JEDEC standard JESD24-1.

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case	IGBT		0.4	°C/W
		Diode		1.2	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500			V
T _J	Operating junction temperature range	-40		150	°C
T _{STG}	Storage Temperature Range	-40		125	
T _C	Operating Case Temperature	-40		100	
Torque	Mounting torque	To heatsink	M4	4.7	N.m
Wt	Package Weight			110	g

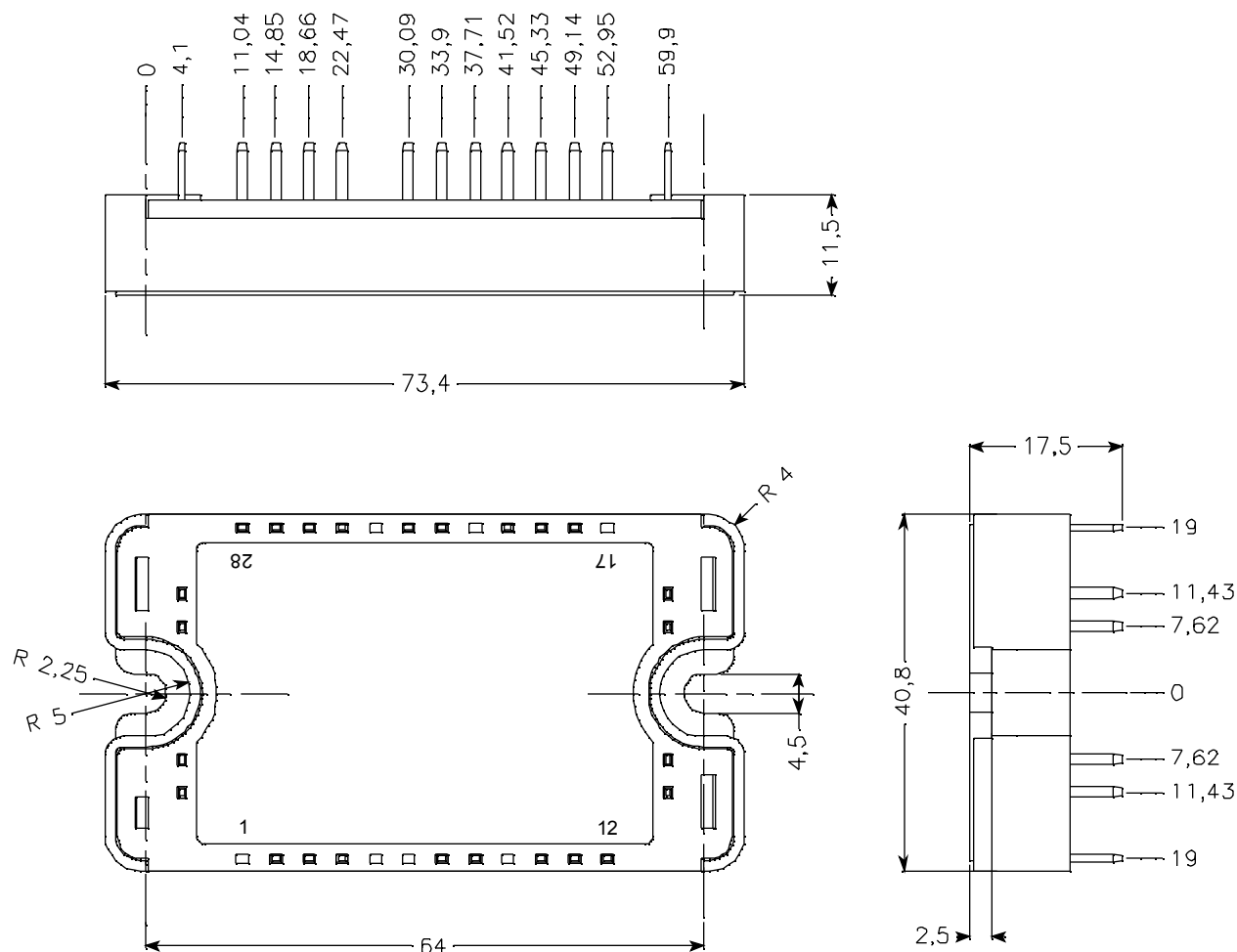
Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		68		kΩ
B _{25/85}	T ₂₅ = 298.16 K		4080		K

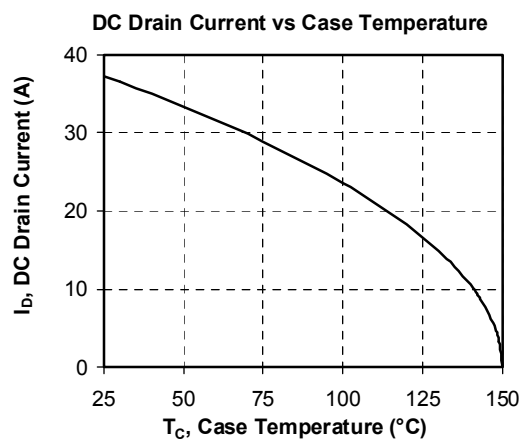
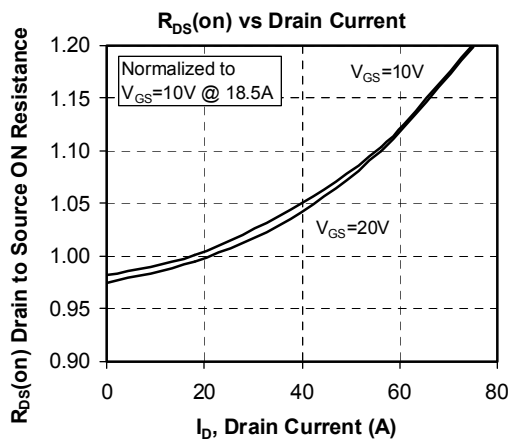
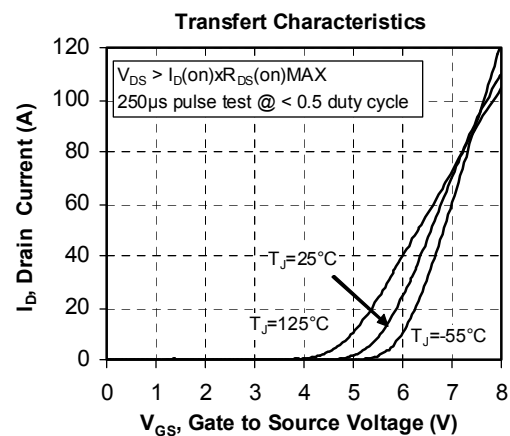
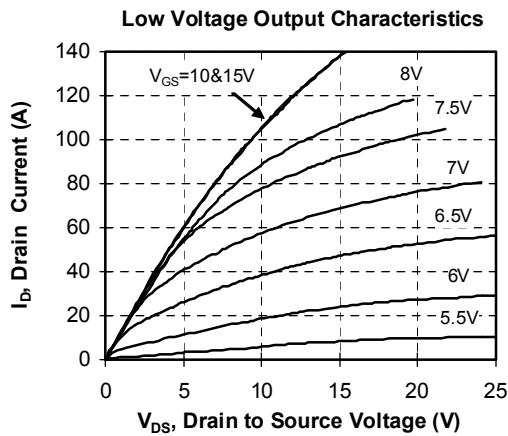
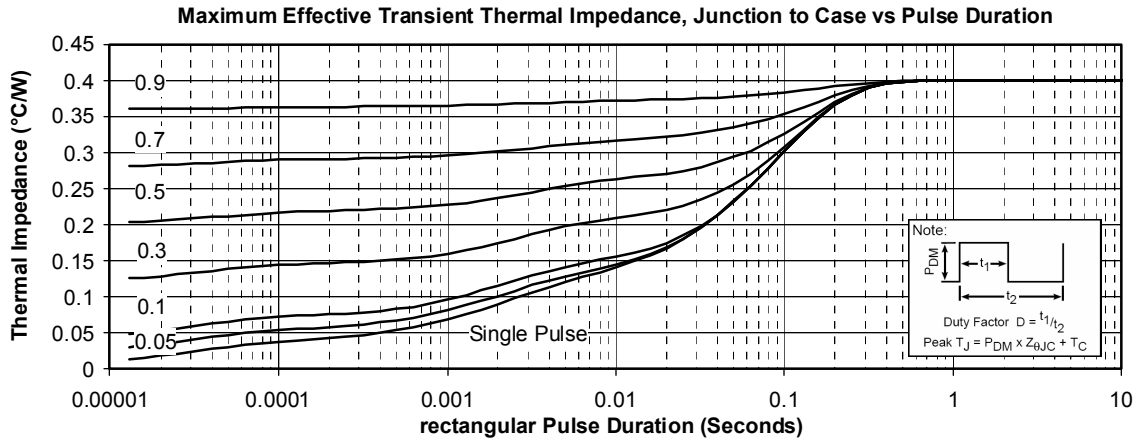
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

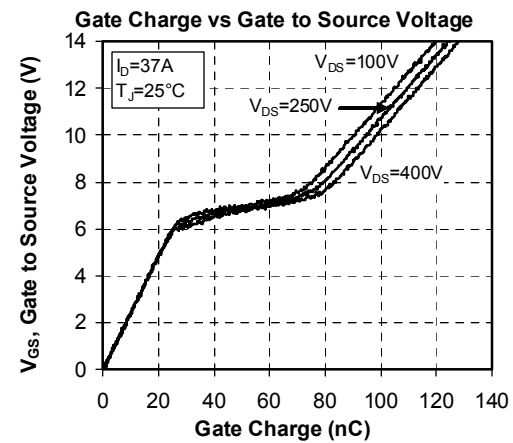
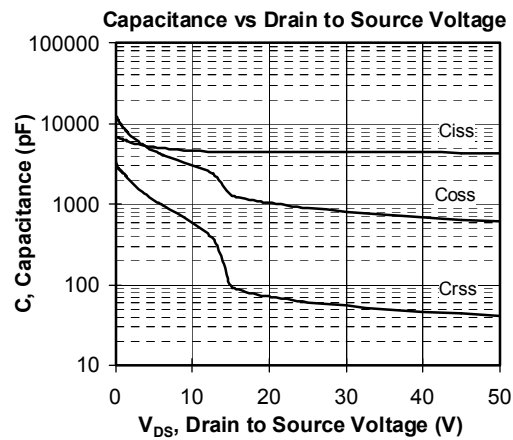
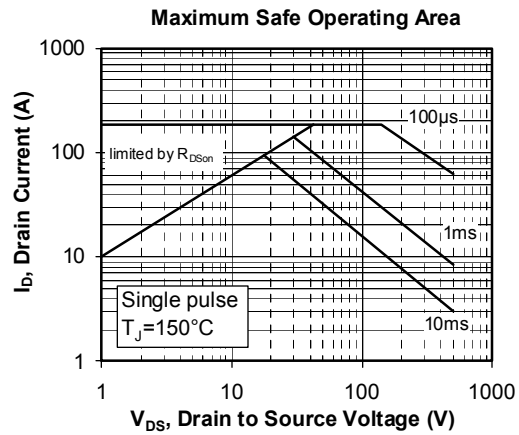
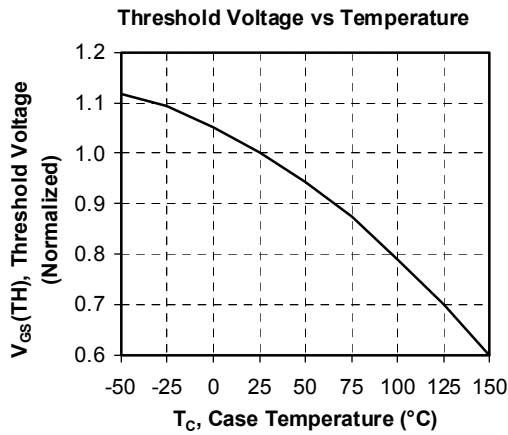
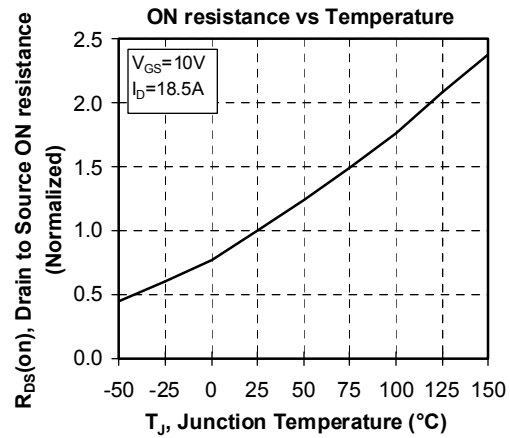
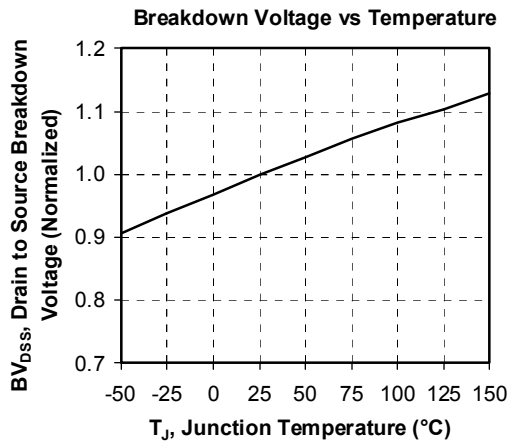
T: Thermistor temperature
R_T: Thermistor value at T

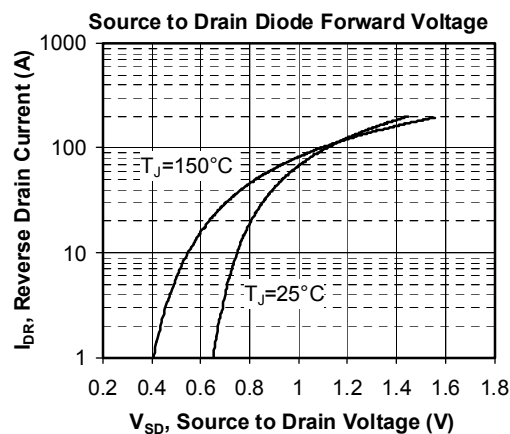
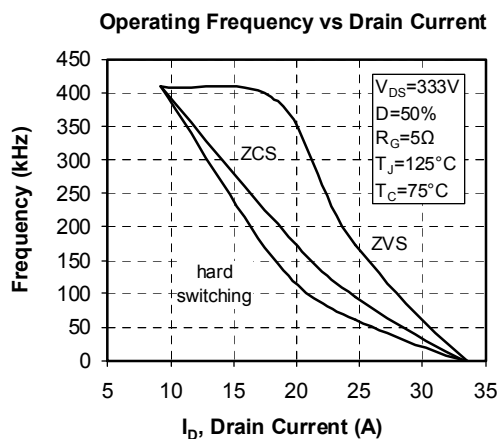
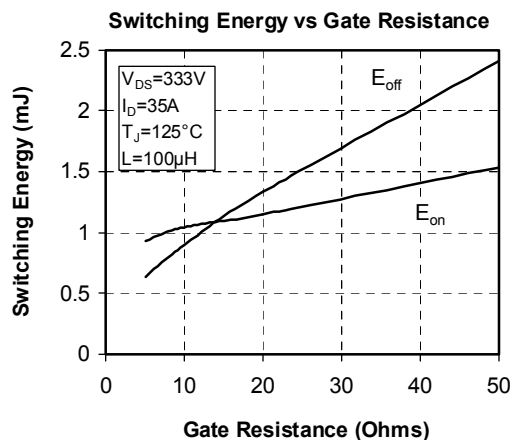
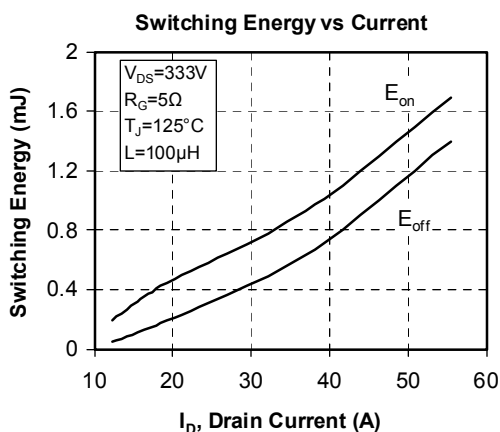
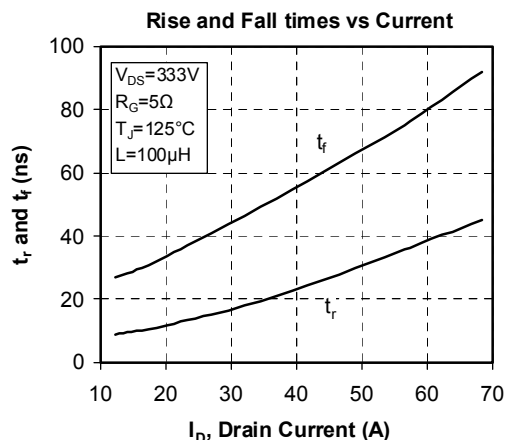
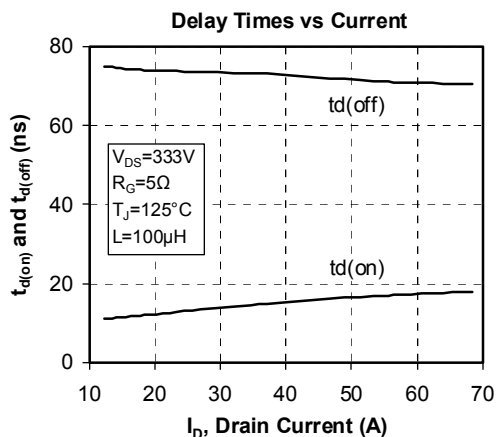
Package outline



Typical Performance Curve







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APT's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.