



# 富满微电子集团股份有限公司

FINE MADE MICROELECTRONICS GROUP CO., LTD.

**055N85**(文件编号: S&CIC2013)

**N-Channel Trench Power MOSFET**

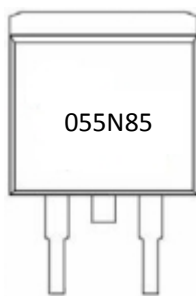
## Features

- $V_{DS}=85V$ ;  $I_D=110A@V_{GS}=10V$ ;  
 $R_{DS(ON)}<6.8m\Omega @V_{GS}=10V$
- Special Designed for E-Bike Controller Application
- Ultra Low On-Resistance
- High UIS and UIS 100% Test

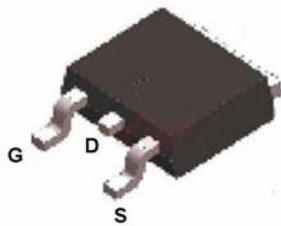
## Application

- 64V E-Bike Controller Applications
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

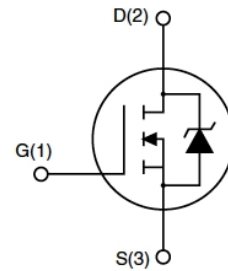
## Package



Marking and pin assignment



TO-263top view



Schematic diagram

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
055N85	055N85	TO-263	-	-	-

**Table 1. Absolute Maximum Ratings (TA=25°C)**

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	85	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	$\pm 20$	V
$I_{D(DC)}$	Drain Current (DC) at $T_c=25^\circ C$	110	A
$I_{D(DC)}$	Drain Current (DC) at $T_c=100^\circ C$	78	A
$I_{DM (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	420	A
dv/dt	Peak Diode Recovery Voltage	7.2	V/ns
$P_D$	Maximum Power Dissipation( $T_c=25^\circ C$ )	202	W
	Derating Factor	1.46	W/°C
$E_{AS}$	Single Pulse Avalanche Energy (Note 2)	528	mJ
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 175	°C

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2.  $E_{AS}$  condition:  $T_J=25^\circ C, V_{DD}=40V, V_G=10V, R_G=25\Omega, L=0.5mH$



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**Table 2. Thermal Characteristic**

Symbol	Parameter	Value	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	---	0.8	$^{\circ}\text{C/W}$

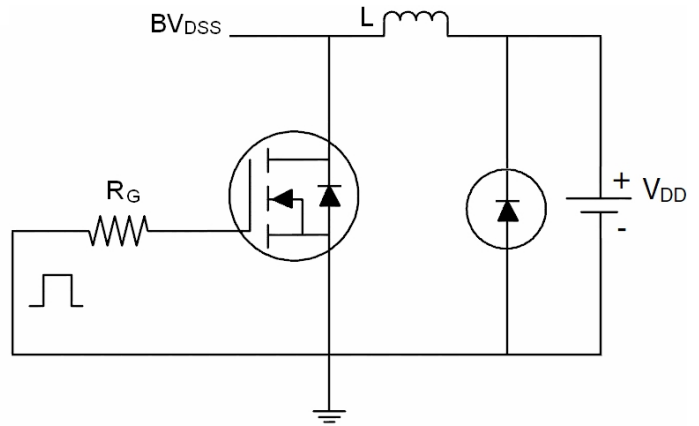
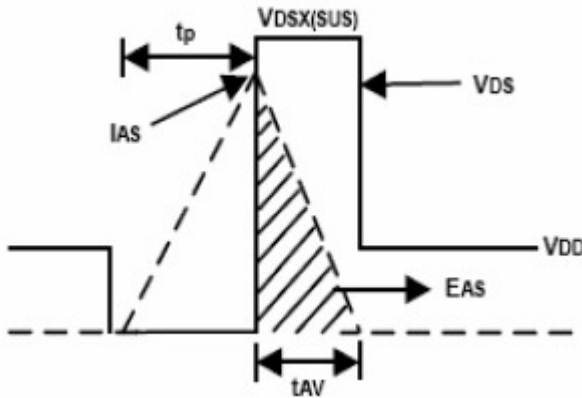
**Table 3. Electrical Characteristics (TA=25 $^{\circ}\text{C}$  unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	85			V
$I_{DSS}$	Zero Gate Voltage Drain Current( $T_c=25^{\circ}\text{C}$ )	$V_{DS}=85V, V_{GS}=0V$			1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2		4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=40A$		5.5	6.8	m $\Omega$
<b>Dynamic Characteristics</b>						
$g_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=15A$	25			S
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0\text{MHz}$		5560		PF
$C_{oss}$	Output Capacitance			482		PF
$C_{rss}$	Reverse Transfer Capacitance			256		PF
$Q_g$	Total Gate Charge		$V_{DS}=50V, I_D=40A,$ $V_{GS}=10V$		152	
$Q_{gs}$	Gate-Source Charge			32		nC
$Q_{gd}$	Gate-Drain Charge			61		nC
<b>Switching Times</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=30V, I_D=40A, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$		35		nS
$t_r$	Turn-on Rise Time			52		nS
$t_{d(off)}$	Turn-Off Delay Time			76		nS
$t_f$	Turn-Off Fall Time			21		nS
<b>Source-Drain Diode Characteristics</b>						
$I_{SD}$	Source-drain Current(Body Diode)			110		A
$I_{SDM}$	Pulsed Source-Drain Current(Body Diode)			420		A
$V_{SD}$	Forward On Voltage <sub>e</sub> (NOTE 1)	$T_J=25^{\circ}\text{C}, I_{SD}=40A, V_{GS}=0V$		0.87	0.99	V
$t_{rr}$	Reverse Recovery Time <sub>e</sub> (NOTE 1)	$T_J=25^{\circ}\text{C}, I_F=75A$ $di/dt=100A/\mu s$		38		nS
$Q_{rr}$	Reverse Recovery Charge <sub>e</sub> (NOTE 1)			69		nC
$t_{on}$	Forward Turn-on Time	Intrinsic turn-on time is negligible(turn-on is dominated by $L_S+L_D$ )				

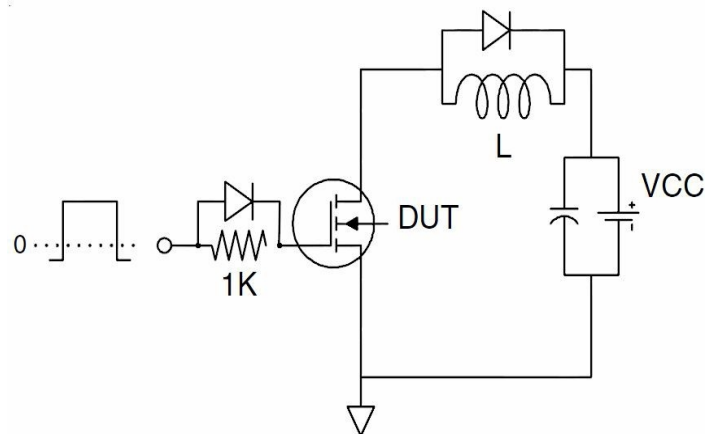
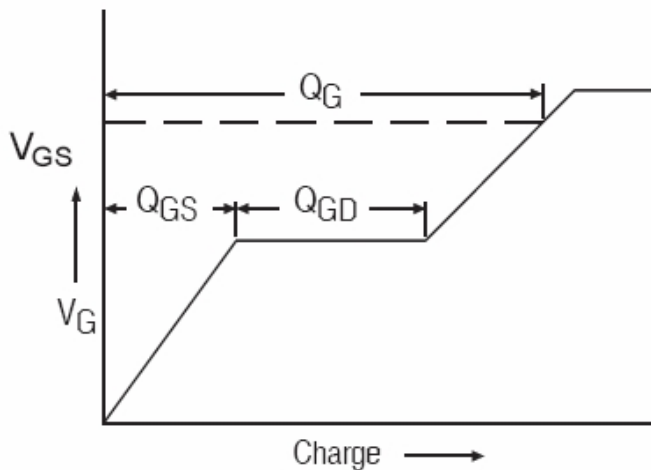
Notes 1. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 1.5\%$ ,  $R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$

### Test Circuit

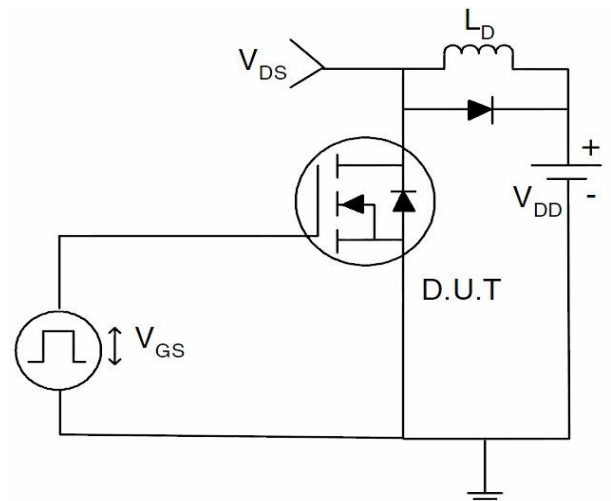
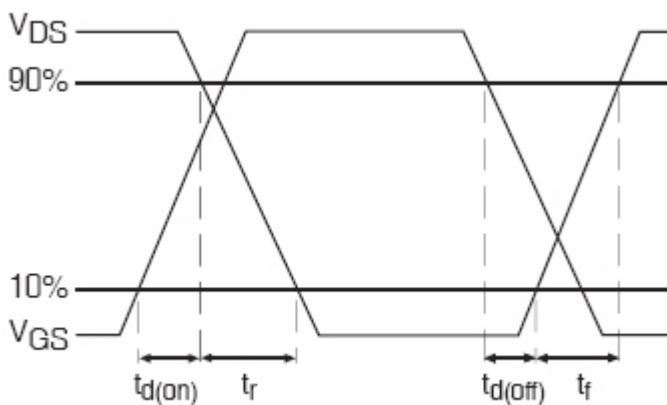
#### 1) E<sub>AS</sub> Test Circuits



#### 2) Gate Charge Test Circuit:



#### 3) Switch Time Test Circuit:





### TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Output Characteristics

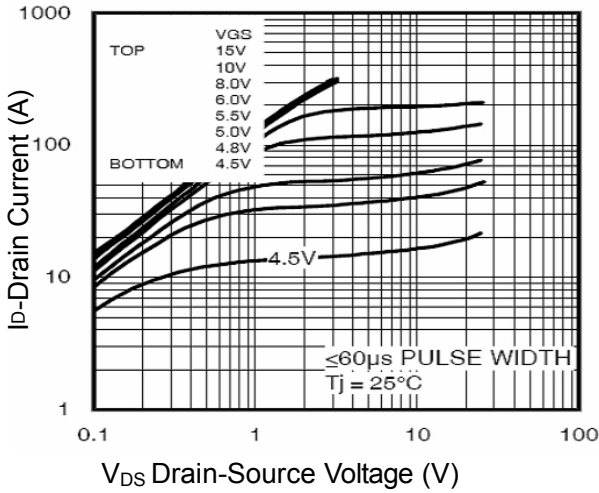


Figure2. Transfer Characteristics

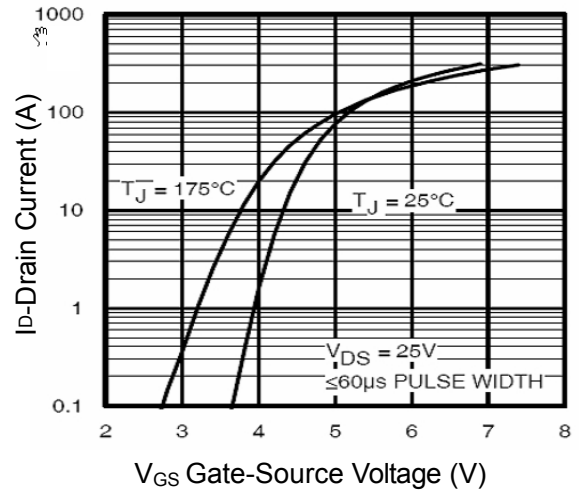


Figure3. ID vs Junction Temperature

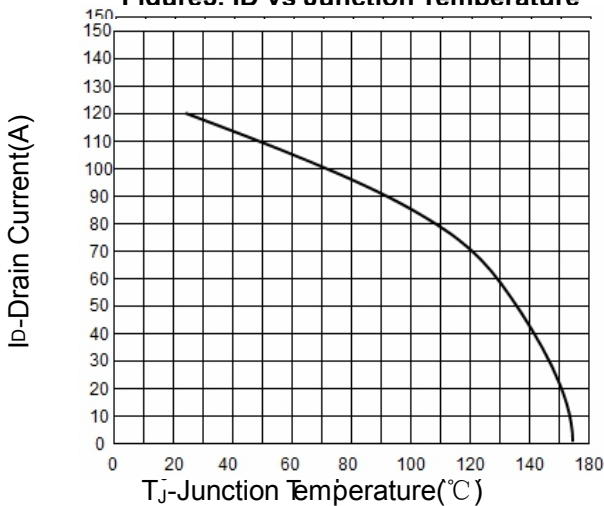


Figure4. Rds(on) Vs Junction Temperature

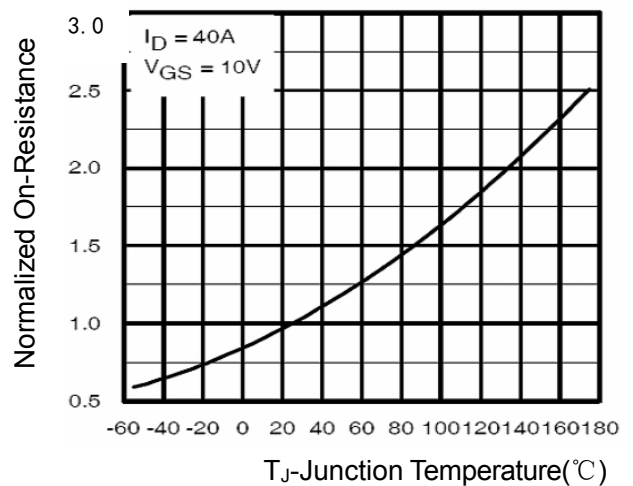


Figure5. BVDS vs Junction Temperature

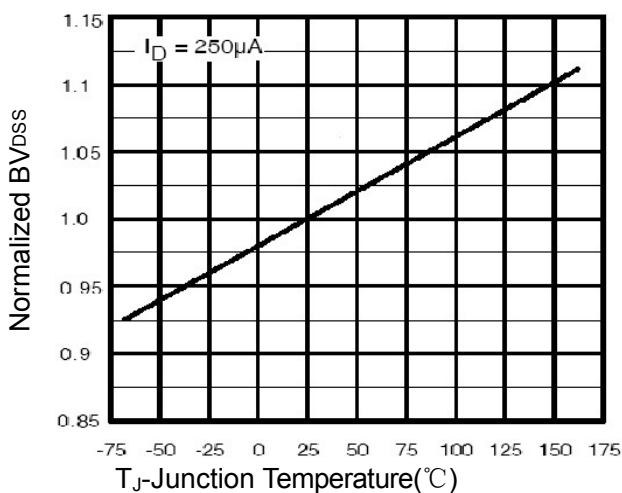
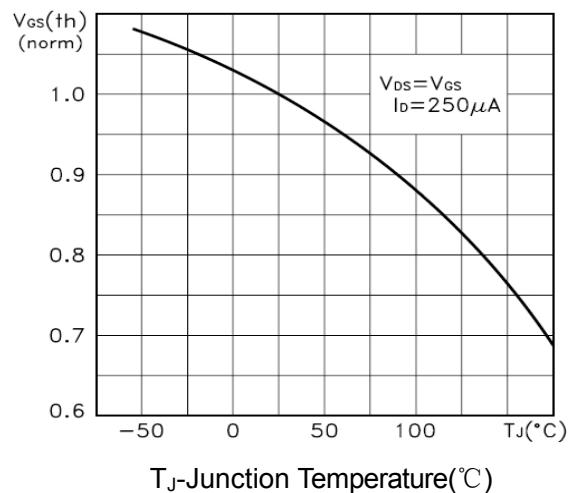
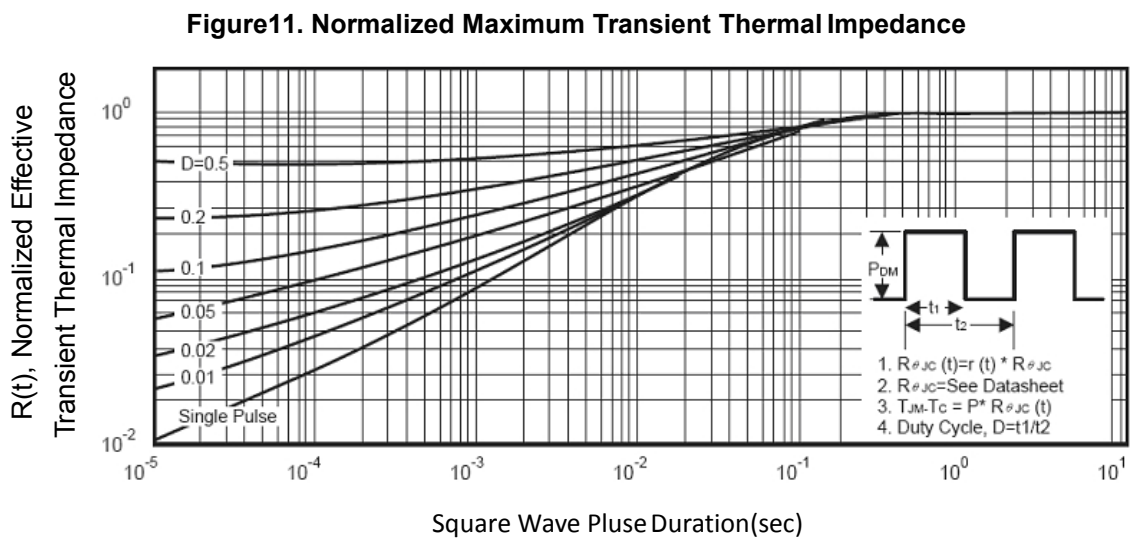
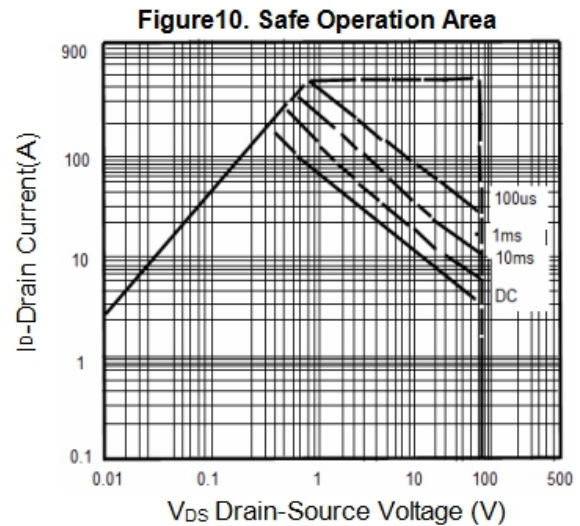
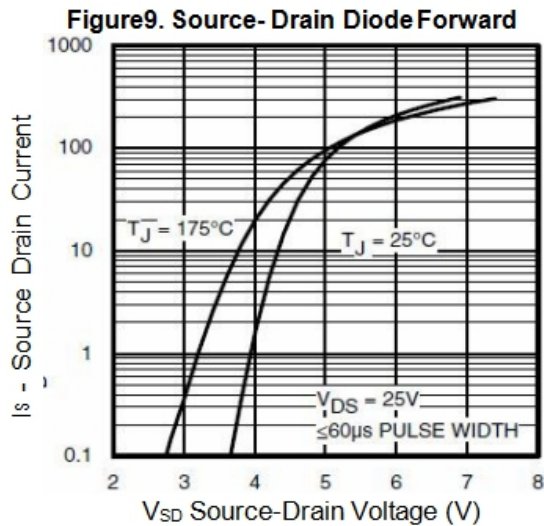
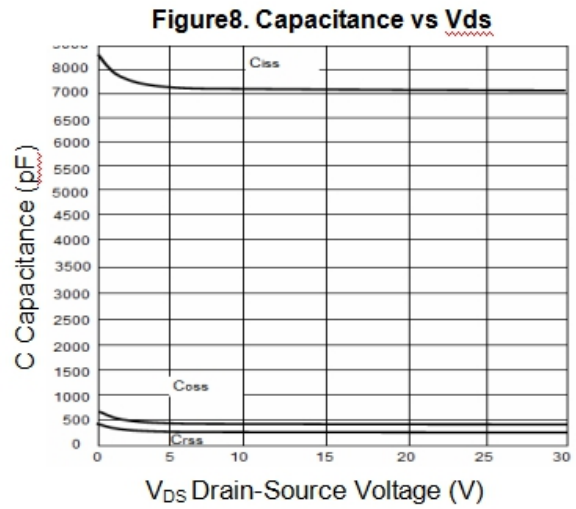
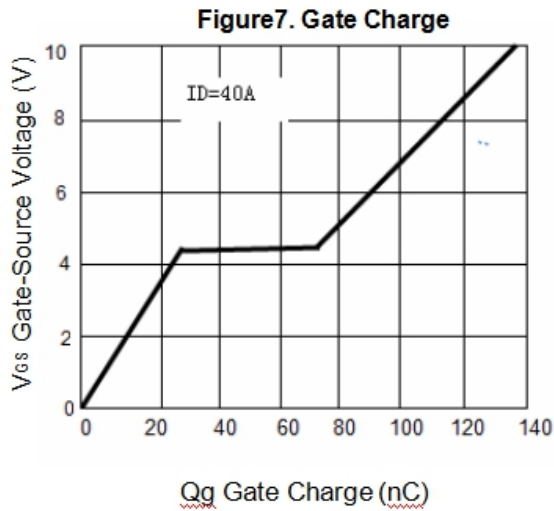


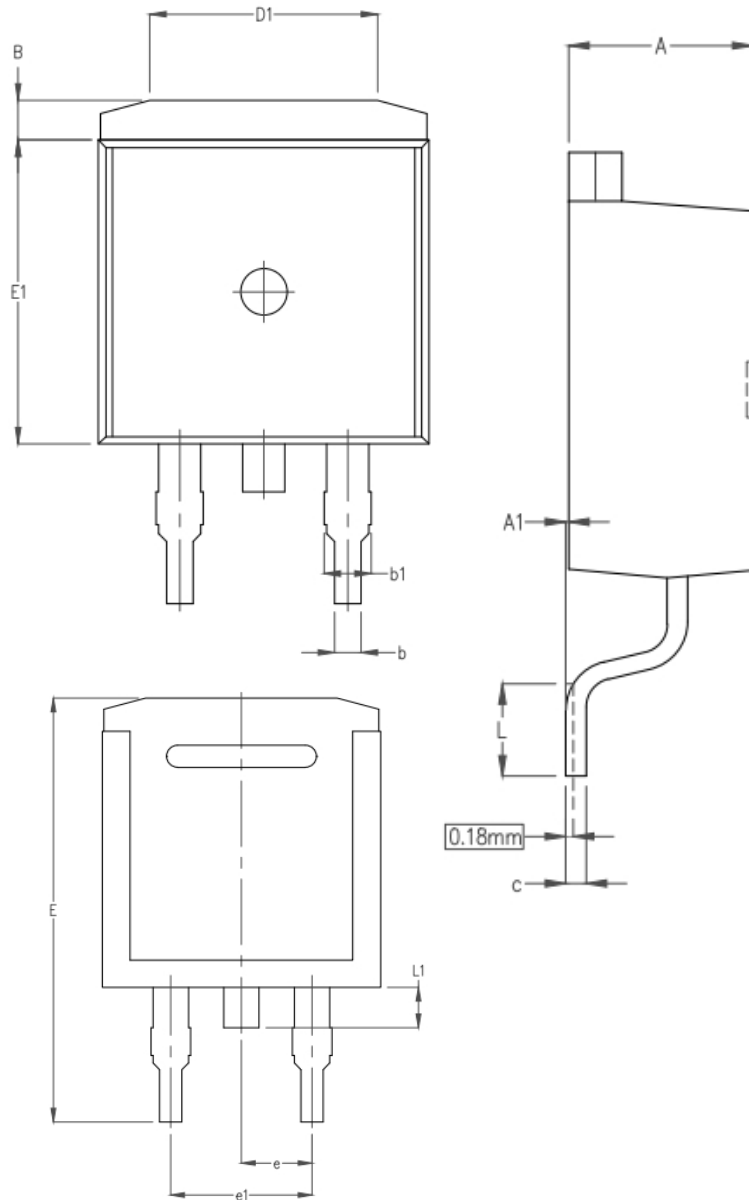
Figure6. VGS(th) vs Junction Temperature







### TO-263 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.45	4.50	4.55
A1	0	0.07	0.15
B	1.08	1.20	1.32
b	0.80TYP.		
b1	1.24	1.27	1.30
c	0.48	0.50	0.52
D	9.95	10.00	10.05
D1	6.89REF.		
E	15.09	15.24	15.39
E1	9.15	9.20	9.25
e	2.51	2.54	2.57
e1	5.05	5.08	5.11
L	2.29	2.54	2.79